

A QUALITY IMPROVEMENT PROJECT: IMPEMETING THE SUNWISE EDUCATION
PROGRAM IN MIDDLE SCHOOL ADOLSCENTS

By
Amanda Merino, BSN
University of Kansas School of Nursing

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JoAnn Peterson, DNP, APRN, FNP-BC

Faculty Project Committee, Chair

Diane Mahoney, DNP, FNP-BC, WHNP-BC

Faculty Project Committee, Co-Chair

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Date Project Proposal Accepted

The DNP Project committee for Amanda Merino certifies that this is the
approved version of the following DNP Project:

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JoAnn Peterson, DNP, APRN, FNP-BC

Chair

Diane Mahoney, DNP, FNP-BC, WHNP-BC

Co-Chair

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A Quality Improvement Project: Implementing the SunWise Education Program in Middle School Adolescents

Amanda Merino

Specialty Area: Doctor of Nursing Practice, Family Practice

Committee Chair: JoAnn Peterson, DNP, APRN, FNP-BC

Committee Member: Diane Mahoney, DNP, FNP-BC, WHNP-BC

Problem: The most common form of cancer in the United States (U.S.) is skin cancer (Center for Disease Control and Prevention [CDC], 2016). Two to three million non-melanoma cancers are diagnosed yearly, while 71,000 cases are diagnosed as melanoma and include a mortality rate of 9,394 deaths yearly (CDC, 2016; World Health Organization [WHO], 2016). In fact, the occurrence of melanoma is rising 2.9% every year in children and adolescents who are less than 20 years old (Davis et al., 2015). With that said, most skin cancers are preventable and are caused by exposure to ultra violet (UV) radiation, with the most prominent source from the sun's natural rays (Skin Cancer Foundation, 2016). The risk for skin cancer doubles if a single, severe sunburn is experienced in childhood (CDC, 2016). The CDC (2016) reports that only a small percentage of high school students (13% of girls and 7% of boys) apply sunscreen when outside for an hour or more. A call to action to reduce risky sun practices amongst adolescents, Goal 2, strategy 2B, encourages schools, particularly kindergarten through eighth grade (K-8), to incorporate sun safety education in the curriculum (United States Department of Health and Human Services [USDHHS], 2014).

Project Aim: The aim of this DNP project was to implement the SunWise program which is the first nationally recognized, multidimensional, interactive, sun protection education program that uses evidence-based recommendations to provide middle school adolescents with an increase of sun prevention knowledge needed to change attitude, perceptions and intent to change their current behavior of risky sun practices and overexposure to the sun. The SunWise program specifically targets children and adolescents in primary and secondary schools (K-8) and is funded through the US Environmental Protection Agency (EPA) (Geller et al., 2002).

Project Method: The theoretical framework for this project is based on the Health Belief Model (HBM) to evaluate adolescents perceived notions, which include basic knowledge about sun prevention, benefits and risks of sun exposure, and the intent to change current practices to recommended behaviors. A sample of sixth graders attending an urban, local, middle school in Kansas City, Kansas, during Spring 2017 was utilized. A 90-minute session that includes a PowerPoint presentation, video clips, active learning discussion and a group activity focused on the damaging impact ultraviolet (UV) radiation has from both a health-based and appearance-based perspective. A Derma-Scan (skin-viewing device) was also used to evaluate sun damage on participants. An identical and anonymous questionnaire, consisting of 30 questions, was given to participants before and immediately following the implementation of the SunWise program. This

DNP project focused on three main outcomes: (1) knowledge of sun safety, (2) perceived attitudes of sun safety and protection, and (3) intent to practice sun-protective behaviors.

Project Findings: Pre- and post-questionnaires were completed by 15 adolescent participants of varying ethnicities. The Exact Fisher test was used to calculate statistical significance ($p < 0.05$). Significant improvement was noted for knowledge variables: ways to keep sun-safe ($p = 0.006$), minimum UV Index number to attain a burn ($p = 0.008$), sun protection on a cloudy day ($p < 0.001$). Intentions to play in the shade increased from 33% to 80% ($p = 0.025$), and intentions to wear sunscreen increased from 40% to 87% ($p = 0.021$). There were no significant findings for changed attitude and perception among these variables: wanting to tan ($p = 0.427$), tans look healthy ($p = 0.169$), and rating the effort (easy, hard) to protect from the sun ($p = 0.324$). Concluding the session participant comments included, “I realized I need to wear more sunscreen,” “I liked the sun relay race,” “the presentation was cool and good,” and “nothing needs to be changed”. One participant suggested, to shorten the presentation. All but one participant, felt they knew more about UV light and sun protection after the presentation.

Conclusion: Brief, sun protection education in the middle school setting can improve knowledge and intentions to change current sun practices among adolescents.

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A QUALITY IMPROVEMENT PROJECT: IMPLEMENTING THE SUNWISE EDUCATION PROGRAM IN MIDDLE SCHOOL ADOLESCENTS

The most common form of cancer in the United States is skin cancer (CDC, 2016). Two to three million non-melanoma cancers are diagnosed yearly, while 71,000 cases are diagnosed as melanoma and include a mortality rate of 9,394 deaths yearly (CDC, 2016; WHO, 2016). In fact, the occurrence of melanoma is rising 2.9% every year in children and adolescents who are less than 20 years old (Davis, Loesch, Rogers, Spantonos, Snyder, Koch, & Harris, 2015). With that said, most skin cancers are preventable and are caused by exposure to UV radiation, with the most prominent source from the sun's natural rays. The risk for skin cancer doubles if even one severe sunburn is experienced in childhood (CDC, 2016). The CDC (2016) reports that in high school students, only 13% of girls, and 7% of boys apply sunscreen when outside for one hour or more.

Significance of Project

From 1982 to 2011, melanoma rates doubled in the U.S. (CDC, 2016). Malignant melanoma rates in the state of Kansas have increased drastically. In the year 2000, there were 16.3 cases per 100,000 people; in 2011 the cases escalated to 23.4 cases per 100,000, yielding more than 700 cases of malignant melanoma diagnosed among Kansans in 2011 (Kansas Department of Health and Environment [KDHE], 2015). A key prevention goal noted in the Kansas Cancer Prevention and Control Plan 2012-2016 is to reduce the incidence of Kansas residents who report a sunburn, as currently, two in five Kansans (39.4%) acquire a sunburn at least once a year (KDHE, 2012). It also supports implementing evidence-based community sun-protection programs with a core focus on adolescent education and conducting studies regarding current sun-protective practices

(KDHE, 2012). Furthermore, from 2006 to 2008 KDHE partnered with the Kansas Coordinated School Health program to promote and implement the SunWise skin cancer awareness program (KDHE, 2012).

Statement of the Problem

Environmental and healthcare organizations are developing and promoting new sun-safe practice strategies aimed at children to prevent and to decrease the risk for acquiring skin cancer later in life (American Melanoma Foundation [AMF] 2015; CDC, 2016; Skin Cancer Foundation, 2016). A call to action to reduce risky sun practices among adolescents, Goal 2, strategy 2B, encourages schools, particularly Kindergarten through eighth grade (K-8), to incorporate sun-safety education in the academic curriculum (USDHHS, 2014). In 2002, the Morbidity and Mortality Weekly Report (MMWR), in collaboration with the CDC, released the “Skin Cancer Prevention Guidelines,” urging school programs to utilize this report to further reduce the risk of skin cancer development among students (Glanz, Saraiya, & Wechlser, 2002). Within the past few years, U.S. and international school-based sun safety educational programs have proven to be successful in increasing sun knowledge and intent to practice sun safety. These evaluation studies have yielded significant evidence signifying the need for sun-safe practice education in all ages of children and adolescents in primary education (CDC, 2016; The Community Guide, 2014; USDHHS, 2014; WHO, 2016). Currently, there are at least seven known sun-safety school programs in the U.S.; however, many schools are underutilizing these established programs and their resources.

Project Purpose

Skin cancer is a growing national concern, and education on sun-safety should begin in childhood (Buller, Reynolds, Yaroch, Cutter, Hines, Geno, ... & Grandpre, 2006; CDC, 2014; Davis et al., 2015). The aim of this DNP project was to implement the SunWise program, which is a multidimensional, interactive, sun-safety education intervention that provides adolescents with evidence-based recommendations and guidelines for sun awareness and protection. This program promotes safe-sun practices and offers sun knowledge to adolescents, so they may be able to make informed decisions when spending time outdoors or considering whether to suntan. The SunWise questionnaire, which was administered to adolescents before and immediately following the program, served as the outcome measure assessing basic sun knowledge, general sun protection attitudes, and current sun practices. The development of this project, data findings, and synthesis were publicly presented. Through research and identifying evidence gaps the following PICOT question was formulated and evaluated: Among sixth grade students in an urban, middle school, does implementing the multidimensional sun-safety education program, SunWise, positively impact the retention of sun safety knowledge, perceived attitude, and intent to change current sun practice behavior immediately following the completion of the program, compared to the students' knowledge, attitude, and behaviors prior to the implementation of the SunWise program?

Definitions of Terms

Theoretical Concept

The most commonly used theory in health promotion is the Health Belief Model (HBM) (Hayden, 2013) (Appendix A). The HBM model poses that personal beliefs and perceptions about a disease shape and influence one's health behavior. It is thought that

individuals complete an internal assessment and contemplate the overall benefit of making a health behavior change (Hayden, 2013). It is known that in the adolescent developmental stage there is a tendency for this age group to possess a sense of immortality, in which they view themselves impervious to any disease, especially skin cancer (Davis et al., 2015). The HBM was utilized as both the conceptual and theoretical framework in developing, implementing, and evaluating adolescents' *perceived susceptibility* to skin cancer, *perceived severity* of skin destruction, *perceived benefits* of sun safety, and the *perceived barriers* of sun safety behaviors.

Concepts Defined

Skin cancer occurs when abnormal skin cells grow rapidly and uncontrollably, developing a gene mutation. A genetic component for the disease can be a culprit, but more commonly skin cancer occurs when the skin is exposed to natural and artificial ultraviolet exposure (CDC, 2014; Skin Cancer Foundation, 2016). Ultraviolet (UV) radiation causes permanent DNA damage that elicits rapidly multiplying mutations of skin cells that, over time, can evolve into a malignant or non-malignant skin tumor (Skin Cancer Foundation, 2016). The two main types of UV radiation that affect the skin that are produced by the sun are UVA and UVB (CDC, 2014; Skin Cancer Foundation, 2016; WHO, 2016). UVB is known to cause sunburn and direct DNA damage by the intermediate levels of energy it creates as it penetrates to the dermis layer of the skin (USDHHS, 2014). UVA radiation, which penetrates deeper at the subcutaneous tissue level, emits less energy than UVB but can cause skin damage and premature aging (USDHHS, 2014). The CDC (2016) specifies the following practices concerning sun knowledge and safety: wearing protective clothing that covers the arms and legs, wearing

sunglasses, staying in the shade during midday hours, avoiding indoor artificial tanning, wearing sunscreen consistently, and reapplying sunscreen when outside. A sun protection factor (SPF) is a number that rates the effectiveness of a sunscreen product at blocking UV rays; the higher the SPF, the better protection it will provide (CDC, 2016).

Operational Concepts

A convenience sample of sixth graders attending an urban, middle school in Kansas City, Kansas, during Spring 2017 was recruited. The term participants, adolescents, and students were used in this project to describe the selected population. One, 90-minute, informative and interactive session was implemented and included a PowerPoint presentation, video clips, an active learning discussion, and group activities. These activities focused on the damaging impact ultraviolet radiation has from both a health-based and appearance-based perspective. A skin viewing device known as DermaScan was used, which allows a person to see any existing skin damage that is caused by the sun's natural rays or from artificial sun exposure (Vital Scan, 2015). The SunWise program questionnaires were given to adolescent participants before and immediately following the implementation of this DNP project. The pre-test and post-test questionnaire consisted of five questions on demographic information, while four questions assessed baseline sun-knowledge about UV radiation, sun damage, and common skin cancer risk factors. Attitudes and perceptions regarding sun-safety and the likelihood of taking sun-protective measures in regards to various activities, pre-program, was assessed in ten questions. Nine questions assessed a participant's current sun-safety practice, whereas two questions assessed if there was an intent to change current sun practices. Knowledge is defined as understanding new information or acquiring a new

skill from education or experiences (Merriam-Webster, 2015). Sun-knowledge is described in this project as the amount of information a person knows about UVA, UVB, sun burning, tanning, skin cancer, premature aging, and ways to protect oneself from the sun. Attitude expresses a feeling or a way of thinking that positively or negatively affects a person's behavior (Merriam-Webster, 2015). Perception is defined by the way someone understands something (Merriam-Webster, 2015). Practice is an application or use of an idea or method that is put into action on a regular basis (Merriam-Webster, 2015). Current sun-practices are described in this project as sun-protective measures that are currently practiced on a routine basis, such as wearing a hat, applying sunscreen, and seeking shade. The independent variable of this project was a multidimensional sun-safety education program, and the dependent variable was an increase in sun-safety knowledge, a change in perception towards seeing the benefit of sun-safety, and intent to practice sun-safety measures in the future.

Outcome Measures

This DNP project evaluated three main outcomes: (1) knowledge of sun safety, (2) perception and attitudes of sun safety and protection, and (3) intent to practice sun-protective behaviors. The primary outcome of interest within this DNP project was an improvement in knowledge of sun-safety and sun-protective behaviors. Positive changes in sun-protective attitudes and intent to change current sun practices were examined as secondary outcomes.

Literature Review

An applicable literature search was completed to locate the most relevant evidence pertaining to school-based sun-safety programs for the adolescent population.

The electronic database search included PubMed, CINAHL, Google Scholar, and Cochrane Library. An initial search of these databases involved the keywords: *education, sun exposure and adolescents*, which yielded a total of 5,100 articles. Specific keywords and Boolean phrases were added to narrow and specify the literature. Phrases included: *sun preventive education, adolescent AND sun safety programs, middle school sun programs, interactive sun programs OR sun education, school based sun awareness, adolescent AND young adult sun protective behaviors, and UVB exposure AND adolescent sun education AND preteens*. An inclusion criteria was constructed and limiters included: random control trials (RCT), case control studies, systematic reviews, family practice and dermatology journal articles, free full-text documents, English language, human studies, years searched between 2000 to 2016. A total of 110 articles remained; abstracts and articles were reviewed for potential inclusion.

Five evidenced-based school sun education programs for middle school adolescents are included in this literature review. Each sun education program study will be discussed independently, covering the program's history and development, outcome measures, sample selection, and the instruments utilized for data collection. The similarities and differences among the five programs' findings, limitations, and future implications will follow in a detailed, literature synthesis. The following programs are listed as follows, in alphabetical order: Environmental Protection Agency (EPA) SunWise School Program, Healthy Skin is In, Students are Sun Safe (SASS) School Program Study, SunSafe in the Middle School Years, and Sunny Days, Healthy Ways.

Environmental Protection Agency (EPA) SunWise School Program Study

The SunWise School Program was developed by the U.S. EPA in 1998, and is the first national and health environmental sun-safety education program intended for children in elementary and middle schools (Geller et al., 2002). The aim of this program is to promote awareness of overexposure to the sun, thereby increasing sun protection behaviors through using school-based learning components. Experts in education, curriculum design, and skin cancer research developed the SunWise ToolKit, which contains all the necessary teaching content that is covered in the 1- to 2-hour program. The SunWise school program allows flexibility and feasibility into educators' time, and involves a minimal time commitment with activities that are easily integrated into existing lesson plans or which can be completed as a supplement (Geller, Rutsch, Kenausis, Selzer, & Zhang, 2003a). The SunWise program meets the National Science Teachers Association and the National Council of Teachers of Mathematics educational standards (Geller, Rutsch, Kenausis, & Zhang, 2003b). Lessons within the Toolkit focus on the effects of UVR, the risk factors for overexposure, and sun-protection habits.

Evaluation of the program was assessed by self-administered pre- and post-tests with an emphasis on students' knowledge, attitudes, practices, and intended practices. The pre- and post-tests originated from other instruments, and child development experts reviewed and edited the tests for content and reading level age appropriateness. Additionally, the tests were pilot-tested on 10 children, aged 6-7 years, and all children completed each test in less than 7 minutes (Geller, Rutsch, Kenausis, & Zhang, 2003b).

All schools, single classrooms, and school districts across the United States were eligible to participate in the program study. All faculty and school nurses could be recruited as facilitators for this program (Geller et al., 2003b). From September 1999 to

June 2000, 130 schools participated and students at 40 of these schools completed the pre- and post- tests. One large school district, consisting of seven schools, served as the control for the study in which they did not receive an educational program but did receive the pre- and post-test. There was a >95% response rate, and less than 3% of the forms lacked data in both the control and experimental groups. The primary measure of the study, using 95% confidence intervals (CIs) and calculated *P* values, compared the pre- and post-test results of the students in the experimental schools. Experimental and control schools were compared, using Z-tests for statistical significance, pre-test to post-test using a secondary analysis.

From 2001-2002 (October to November), an additional 300 schools had participated. This now totaled 455 participating schools since 1999 (25 in 1999-2000, 130 in 2000-2001, and 300 in 2001-2002) (Geller, et al., 2003ab). Out of the 455 schools, 137 schools were randomly chosen to participate and 85 of those schools (62%), in 35 states completed 4,558 pre-tests and 4,016 post-tests. The pre- and post-tests were the original tests used in the 2000-2001 school year, and that data was collected and analyzed. Fifty-five percent of children were between the ages of 10 and 12, and only 5% were 13 years or older. The SunWise program then surveyed the same children during the 2000-2001 and 2001-2002 school year, which involved 11 schools in 6 states, with 477 participating students. The intent of the survey was to determine if the program maintains healthy sun-safe attitudes, knowledge, and behavior change.

Kyle et al., (2008) evaluated the cost effectiveness of this school-based program, as few studies have been conducted. The cost/benefit and cost effectiveness of the SunWise program was estimated over a 17-year operation of the program (1999-2015)

and was compared to no intervention (Kyle et al., 2008). He concluded if the school program progresses until 2015, this will result in preventing more than 50 premature deaths, 11,000 new diagnosed skin cancers, and 960 quality adjusted life-years among its reached participants (p. e1074).

Healthy Skin is In School Program Study

This doctoral nurse practitioner evidenced-based practice project was implemented in Northwest Indiana in 2012. This multifaceted program delivered sun safety-knowledge to a convenience sample of 169 seventh- and eighth-grade middle school students to develop the behavioral skills needed to decrease their risk of developing skin cancer in the future. The HBM and the Academic Center for Evidence-based Practice (ACE) Star Model, which puts research into practice while improving care, was the theoretical framework for this DNP project. Knowledge of sun-safety, likelihood to participate in sun-safe practices, and attitudes towards taking sun precautions were the major outcomes named.

The project involved two 50-minute, health- and appearance-based sessions ranging from a facilitator-led PowerPoint to group discussion and activities including an interactive skin viewing device. Out of the 169 middle schoolers, only 125 successfully completed all three questionnaires.

Descriptive pre-, immediate post- and one-month post-questionnaires assessed the effectiveness of the overall program, and evaluated the three outcomes of the project: participant's knowledge of sun-safety, likelihood to participate in sun-safe practices, and attitudes towards taking sun precautions. Questionnaires were adapted from another

previous sun education program in which the Kuder-Richardson reliability was 0.71 for knowledge variables, and content validity and reliability were established.

Students are Sun Safe (SASS) School Program Study

The SASS program is a 50-minute, media-driven, sun-safety program designed for middle and high school adolescents in the school setting (Davis et al., 2015). The program was implemented at nine voluntary schools in five school districts in Tucson, Arizona and was presented to 1,284 students. Demographic data were not collected on individual students, but the ethnicities of the school were collected. The aim of this study was to assess the differences between the middle and high school level students, as well as teacher satisfaction with the intervention. The program came about in 2010 at the University of Arizona (UA) Cancer Center Skin Institute and was created collaboratively with a behavioral scientist, epidemiologist, dermatologist, health educator, nursing student, and high school teacher. The HBM served as the theoretical framework for this program.

UA college students who were enrolled in the “Skin Cancer Prevention in the Community Setting” class for college credit delivered the intervention to the adolescents. Two main outcomes of the SASS program were to raise awareness that ultraviolet radiation (UVR) exposure causes skin damage, and to teach the adolescents ways to keep their skin healthy. The session consisted of a 25-minute, health-based PowerPoint presentation and three interactive sun-safety activities. Visualizing their skin in a UV skin analyzer, listening to a video testimonial of an 11-year old melanoma survivor, and using a frisbee with UV detection were some of the components of the program.

The students were given pre- and two- and four-week post-program tests that evaluated their sun-safety knowledge, perceptions and short-term behaviors, intent to partake in recommended sun-safe practices, and overall satisfaction with the program. The pre- and post-tests were identical and adapted from another study's measure of adolescents' health behaviors. Four of the seven items were scored on a five-point Likert scale, and three items asked multiple-choice, knowledge-based questions. Five program satisfaction questions were given to the students immediately following the program completion. Teachers received a 10-item questionnaire about the program's content strength and length, age appropriateness, selected activities, and technology, and were also asked two open-ended questions about what they liked most and least about the program. Both surveys were also scored on a five-point Likert scale. The Wilcoxon rank-sum test was used for pre- and post-test data, and a chi-square test was used for the knowledge pre- and post-test questions. The different grade levels were coded as data were collected, and each variable was examined for differences in responses between the middle and high school students. For both the student and teacher satisfaction surveys, item means and frequencies were calculated and open-ended teacher responses were grouped by common themes and phrases.

SunSafe in the Middle School Years Program Study

SunSafe in the Middle School Years is a multi-component, community-wide program aimed at informing adolescents in the sixth to eighth grade on sun-protection and skin cancer awareness (Olson et al., 2007). Additionally, the program includes a 30-minute introductory educational session to ensure proper training of teachers, school staff, athletic coaches, and primary care physicians. Therefore, community educators as a

unit can serve as change agents and promote sun protective behaviors full circle. After adolescents complete the program and view their skin with a DermaScan, a skin-viewing device, they are divided into “Sun Teams” with the goal to hold one another accountable and to give friendly reminders when sun-protection could be utilized. Furthermore, sun-safe messages are displayed at community stores and at community pools. Support is also given from primary care physicians advising sun-protection behaviors through office visits and handouts of patient sun education material. The theoretical approach for this study was based on Bandura’s social cognitive theory and Rogers' protection motivation theory (Olson et al., 2007).

Sunny Days, Healthy Ways (SDHW) School Program Study

The Sunny Days, Healthy Ways program targeted sixth through eighth graders (11-15 years) in a primary school setting throughout 28 middle schools in Colorado, New Mexico, and Arizona in 2001 (Buller et al., 2006). The conceptual framework for this study is the social cognitive theory. The chosen schools were arranged by state and paired based on demographic features. From there, a school in each pair was randomly assigned to the intervention group and the other school was assigned the control. In total 1,769 students participated with 43.2% being male and 56.8% being female. The most prevalent ethnicity of the total participants was white, 78.0%, and the remaining 22% were non-white (Black 6.3%, American Indian 7.7%, Asian 5.1%, other 2.9%).

The program consists of six, 50-minute in school, weekly lessons with a focus on sun-protection behavior and sun-safety. Teachers in the intervention schools attended a two-hour training course where research facilitators educated them on sun-safety, various skin cancers, and reviewed the curriculum outline, role-modeling instructional activities,

along with implementation and testing processes. An identical pre- and post-test were given, both to the intervention group, and the control group. The educational sessions taught prevention skills, such as selection and application of a sunscreen, choosing sun-protective clothing, utilizing shade, and learning how to minimize time spent in the sun. Concluding the final session, nine out of 20 teachers in the implementation group returned a requested checklist stating all the material in the six sessions were taught.

Many outcomes were measured in this study. These measureable effects were sun-protection knowledge, self-efficacy expectations about sun safety, perceived barriers to the use of sun protection, and attitudes toward sun tanning. The primary outcome measure was a self-reported sun-protection diary all students kept during the length of the program. The daily diary asked students about the amount of time spent outside and amount of protective coverage worn during P.E, lunch, and recess. A body coverage degree was created, ranging on a scale from 0 to 15. Also, a series of five-point frequency items inquired how regularly students apply SPF >15, wear sun protective clothing and sunglasses, and seek shade. To validate these self-reports, a sub-sample of students from each class (191 total) was selected during a school day to have their skin tone on their inside upper arm, and outside lower arm evaluated using a colorimeter. Secondary measures involved inquiring about students' frequency of lying out in the sun to get a tan, importance of having a tan, using self-tanning lotion, and the number of sunburns acquired the previous summer and the previous month. Skin cancer risk was measured by hair and skin color, sun sensitivity (susceptibility to sunburn and tan), and state lived in. Ten true/false items on sun-knowledge, 17 five-point Likert agree/disagree questions on attitudes towards sun exposure, and 4 three-point questions linked to content

in the curriculum were administered. A knowledge score was created with a Kuder-Richardson reliability of 0.71.

Literature Synthesis of Sun School Program Findings

In the review of the selected literature, all of the studies had comparable findings and recommendations for how to present sun-safety education to adolescents in middle school. There was a difference in geographic location for initiated programs as only two study programs were initiated in Arizona or in the Western U.S. (Buller et al., 2006; Davis et al., 2015). Two program studies were implemented outside the United States: one in France, another in Australia (Sancho-Garnier et al., 2012; White et al., 2010). There was only one study that took place in the Northeastern U.S. (Olsen et al., 2007). Only two program studies took place in a secondary school with the remaining schools being public (Glanz et al., 2002; White et al., 2010).

Program outcome measures evaluated the effectiveness of middle school adolescent sun-safety students' self-reported protective behaviors, (Buller, 2006; Davis et al., 2015; Geller, et al., 2003; Olson et al., 2007; Sancho-Garnier et al., 2012; White et al., 2010), sun-safety knowledge (Buller, 2006; Davis et al., 2015; Geller et al., 2003; Sancho-Garnier et al., 2012), and attitudes toward sun-protection (Buller et al., 2006; Davis et al., 2015; Geller et al., 2003; Sancho-Garnier et al., 2012; White et al., 2010). Four of the five studies have in common an increase in the retention of sun-safety knowledge after the intervention compared to before the intervention (Buller et al., 2006; Davis et al., 2015; Sancho-Garnier, 2012; White et al., 2010). Post intervention, two studies showed adolescents had a decrease in the appeal for tanned skin (Davis et al., 2015; Buller et al., 2006). A post sun-safety program resulted in adolescents stating they

would increase the use of sun-protection methods (Buller et al., 2006; Sancho-Garnier, 2012; White et al., 2010) and one study showed an actual increase of adolescents wearing long sleeve shirts during recess or an outside activity (Buller et al., 2006).

Theoretical & Conceptual Framework

Theoretical Concept

The Health Belief Model (HBM) is one of the most widely known conceptual frameworks to help explain and predict individual health behavior change by assessing one's perceived attitudes and beliefs (Hayden, 2013; Skinner, Tiro, Champion, 2015). The HBM model proposes that personal beliefs and perceptions about a disease shape and influence one's health behavior. It is thought individuals complete an internal assessment and contemplate the overall benefit of making a health behavior change (Hayden, 2013). This model was utilized as both the conceptual and theoretical framework for this quality improvement project among adolescents.

In the 1950s, the HBM was created by a team of social psychologists working in the U.S. Public Health Service to understand why people were neglecting to participate in programs that screened and detected disease, like tuberculosis (TB) (Skinner et al., 2015). Within the HBM, four main concepts exist: *perceived severity*, *perceived susceptibility*, *perceived benefits*, and *perceived barriers*. These concepts expose an individual's perceived health behavior, revealing why one person's health choices differ from another person's (Hayden, 2013). The HBM suggests people are prepared to initiate change of actions if they (a) have a belief the condition has severe enough consequences (*perceived severity*), (b) feel they are susceptible to the condition (*perceived susceptibility*), (c) believe that in initiating change this would reduce their susceptibility and the severity of

the condition (*perceived benefits*), and (d) understand that initiating action outweighs the barriers (*perceived barriers*) (Munden, 2013; Orji, Vassileva, Mandryk, 2012). In the adolescent developmental stage this age group will often proclaim a sense of immortality and invulnerability to any disease, especially skin cancer (Davis et al., 2015).

This project examines, through utilizing the HBM, whether adolescents believe skin cancer is dangerous and deadly and believe they can acquire skin cancer, and assesses their opinion on taking sun-safe measures to decrease the risk of skin cancer.

Perceived Severity and Seriousness

Adolescents were assessed pre-intervention, by answering sun-based knowledge questions to examine their current attitude on the potential severity of skin cancer and its consequences. Many adolescents believe severity is directly related to exposure length, i.e., tanning for shorter periods of time are safer than longer periods (Woodgate, Safipour, Tailor, 2015). Often, adolescents think the severity of tanning is more dangerous when tanning artificially than tanning outside, as that is considered a natural exposure (Woodgate et al., 2015). As qualitative studies have proven, adolescents understand some of the risks associated with sun exposure, but misconceptions exist with identified knowledge gaps (Ashioff et al., 2009; Lazovich et al., 2004; Woodgate et al., 2015). It appears adolescents can justify their risk factors by disregarding unfavorable information while rationalizing the risky decision, and continuing the action based on whether others are participating (Woodgate et al., 2015).

Perceived Susceptibility

This concept entailed an adolescents' attitudes towards their predisposition to developing a skin cancer. The HBM indicates that a person must feel they are at risk of

contracting a disease or a health condition before they are willing to make a change in their current health practices (Skinner et al., 2015). The illusion of invulnerability and invincibility is common among this group and considered a natural element in the adolescent stage. During this time, risky behavior is at its highest due to a decreased outlook of a perceived risk (Wickman, Anderson, Greenberg, 2008). Interestingly, when questioned about the risk of developing cancer, adolescents do perceive that everyone is susceptible to cancer because it lives throughout the body until something ignites it to mutate (Woodgate et al., 2015). Also, adolescents believe by maintaining a healthy body this prevents negative outcomes associated with participating in risky practices (Woodgate et al., 2015).

Perceived Benefits

The perceived benefit of adolescents choosing to abstain in risky sun behaviors was evaluated in this DNP project. Skinner et al. (2015) reinforces that a person will choose to terminate an action if there is a substantial, reasonable, benefit to avoiding the action. For example, adolescents feel that if skin cancer will appear it will be much later in life, when their appearance will not matter as much. Therefore, having tan skin now is a benefit and worth the future risk (Munden, 2013; Wickman et al., 2008; Woodgate et al., 2015). Adolescents also perceive a tanned appearance increases one's overall attractiveness and makes a social encounter more comfortable (Dennis, Kancherla, Snetselaar, 2009; Munden, 2013).

Perceived Barriers

When actions are an inconvenience, even if the action is a protective one, this is considered a perceived barrier (Skinner et al., 2015). Sun protection clothing has been

shown to be a perceived barrier to taking sun protection measures as it can cause a psychological and physical discomfort in the adolescent population (Holloway & Galvin, 2013). Psychologically, adolescents feel unattractive when covered with garments and while wearing sun hats, and that covering up in the heat is physically uncomfortable (Holloway & Galvin, 2013). A barrier to utilizing sunscreen among this age group is the frequency of re-application, applying sunscreen that irritates the skin, and not knowing which type of sunscreen to apply for various weather climates (Buller et al., 2006).

Project Assumptions

The DNP project facilitator had five main assumptions through completion of the SunWise program session for middle school adolescents.

- 1) The facilitator assumes that student's sun-based knowledge will increase following the educational program intervention.
- 2) Students will encounter a positive change in perceptions and attitudes regarding sun awareness following the educational program intervention.
- 3) Students will display an intent to change in sun-protective behavior immediately following the educational program intervention.
- 4) Most of the students in this study will be in the age range of 11-12 years old.
- 5) Many primary middle schools do not implement a sun education program or adhere to the CDC's evidence-based guidelines for school sun-safety.

Methods

Project Design

Following a formal proposal defense in February 2017, this quality improvement project (QI) was approved by the institutional review board (IRB) at the University of

Kansas Medical Center (KUMC) (Appendix B). A QI project design is when small actions bring instant improvements in health care delivery among various settings (Lynn, Baily, Bottrell, Jennings, Levine, Davidoff... & Agich (2007). Permission for this SunWise program session was granted by the Arrowhead Middle School principle and science teacher (Appendix C). This project utilized a descriptive, quality improvement design using the SunWise grade 6-8 Toolkit for a sixth-grade middle school science class. Adolescents who volunteered participated in a 90-minute interactive session, which focused on the damaging impact of sun exposure from both health-based and appearance-based perspectives. The session was comprised of a PowerPoint presentation, a short video featuring pediatric and adolescent melanoma survivors, an active learning discussion about sun protection, and a relay race.

Adolescent participants were given the option to view their face by using a DermaScan machine (Vital Scan, 2015). The DermaScan machine magnified the image of the participant's face using a black light. The black light highlighted areas on the face where skin was over-exposed or sun-damaged (DermaScan, 2015). A section was dedicated on both the parental and child assent forms, which included information and any associated risks about this optional activity. The project facilitator monitored this station to make note of any skin concerns she or a participant recognized. A note, developed by the project facilitator and the school nurse, was available to send home with the participant to their guardian, which recommended a further assessment by a health care provider (Appendix D).

Project Setting & Sample

A convenience sample of a sixth-grade science class at Arrowhead Middle School

in Kansas City, Kansas, served as the participants for this DNP project. This middle school was selected as the project facilitator knew the previous school nurse. Student participation was on a volunteer basis; students were not penalized if they did not wish to participate in all or parts of the session. Students who did not wish to participate or did not return a parental consent form were transferred to another class for the 90-minute period.

Selection Process

The selection process included randomly selecting a sixth grade, middle school science class. The first-class period was chosen, upon discussion with the science teacher, to give the project facilitator enough time to prepare for the session. There were 20 students total in the chosen class. Students were asked to participate on a volunteer basis by obtaining parental consent (Appendix E, F) and child assent (Appendix G, H) and forms were available in the English or Spanish language. A parental consent form was sent home with each participant two weeks prior to the SunWise program session. A parental consent had to be returned to the science teacher on March 30, 2017, as this was the date of the SunWise session. Inclusion for this project consisted of participants who returned a parental consent, signed a child assent, and included all genders, socioeconomic statuses, races, and ethnicities. Students who spoke English, Spanish, or who were bilingual were eligible to participate in the program. A total of 16 out of 20 consents were returned to the science teacher. On the day of the program session, one student who returned the parenteral consent was absent; therefore, 15 students participated.

Project Planning

A month-to-month timeline was created to hold the project facilitator accountable (Appendix I). Furthermore, as this project was not grant funded, expenses and donations were tracked by the project facilitator (Appendix J). Communication between the project facilitator and the science teacher occurred by email, telephone encounter, and by meeting in-person. Through collaboration efforts a date, class time, and an interactive sun activity were agreed upon. To ensure all components of the session were addressed, the project facilitator with assistance from the science teacher created a time-sensitive session outline (Appendix K). The SunWise program was implemented in late March 2017, to approach participants in early Spring in preparation for the coming summer months.

Acquiring the DermaScan machine was made possible by contacting the director of outreach services at KU Midwest Cancer Alliance in February 2017. KU Midwest Cancer Alliance also graciously donated samples of 30 SPF sunscreen packets, sunscreen lip balm, and a sun protection pocket guide. The University of Kansas Dietary Services, located at the Lawrence campus, donated KU-affiliate UV protective sunglasses. Prior to the session, donated items were sorted into cellophane bags and handed to every participant once the session concluded.

A PowerPoint presentation created by the SunWise program was modified by the project facilitator to include information on the increased risk for skin cancer in darker skin tones. Additionally, a step-by-step guide locating the UV index for March 30, 2017 in the Kansas City, KS area was integrated. Sun-protective clip-art images were added to include images of famous people utilizing sun-protective measures that were tailored to the adolescent population and added an appearance-based perspective. Images that

showed the differences in how UVA and UVB rays penetrate the skin were also added to the presentation. Following the presentation, a short video about pediatric melanoma was selected to add a media-driven component.

Initially, the *UV SunWise Frisbee Science* interactive activity was selected for this session. This activity would have included viewing a UV-sensitive frisbee outdoors and then estimate the time it took for the frisbee to change color when exposed to various SPF sunscreens. A back-up activity was also chosen in case weather conditions would not permit going outdoors. *The SunWise Speedy Sun Relay Race* was selected with the goal that teams would accurately and quickly select sun-protective clothing (Appendix L).

Project Implementation

A 90-minute educational session using components of the SunWise Toolkit for sixth graders was implemented on March 30, 2017. Completed child assents were collected while the pre-questionnaire was distributed to participants by the science teacher. The pre-questionnaire inquired students' basic sun-knowledge, attitudes and perceptions about sun protection, current sun-protective practices, and intent to change current practices. The questionnaire was administered before the program session. Participant demographics were also collected; a question about the participant's race was added for demographic purposes. The project facilitator read the SunWise pre-questionnaire out loud while the student participants independently answered the corresponding items. The pre- and post-questionnaires were stapled together and handed out to each participant. This was to ensure every pre- and post-questionnaire was from the same participant so individual outcomes could be measured. It was found the participants took 12 minutes to complete the pre-questionnaire.

A PowerPoint presentation provided by the SunWise program, with slides adapted by the project facilitator, was used to provide a fifteen-minute, interactive, educational experience (Appendix M). To ensure the presentation was interactive and the participants were interested, true/false slides were dispersed throughout the presentation. A short, four-minute, video clip called *The Faces of Pediatric Melanoma* created by the MD Anderson Cancer Center (2014) followed the PowerPoint. The video depicted adolescents who have had melanoma and the emotional and physical effects it had on them.

Due to unforeseen weather conditions, the outdoor frisbee activity could not be utilized; thus, the students participated in the relay race. The students took the newly learned information about sun-protective clothing, which was included in the PowerPoint presentation, and put it into action by way of a relay race. The project facilitator arranged three relay race stations in the school cafeteria. A pile of clothes, sun-protective and non-sun-protective, sat at the end of each station. On the other end of each station was a starting line. Participants were divided into three teams, and each team selected a model. The goal was to be the fastest team and properly dress their model for a 65-degree, sunny, spring day. The models stood at the starting line with their teammates behind them. One at a time the teammates ran down to the other end of the station, sorted through the pile, grabbed a single item, and brought it back for the model to wear.

Participants returned to the classroom once a relay race team was declared the winner. The project facilitator then demonstrated how to use the DermScan machine, which sat on a desk in a corner. A thin, light-shielding curtain covered the inside of the machine; participants lifted the curtain and placed their face directly in front of the

surrounding black lights. A round-shaped mirror was attached inside the machine so the participant could view their skin. On the opposite side of the machine was a slotted window that allowed the project facilitator to simultaneously view and describe a participant's face. One by one, voluntarily, a participant viewed their skin along with the project facilitator and returned to their seat to begin the post-questionnaire independently.

Post-questionnaires were immediately answered by participants following the program session. Participants completed the post-questionnaire in 15 minutes. Once the session concluded, the project facilitator thanked the class and the science teacher for their participation and in return handed out a participation gift bag.

Data Collection Methods

An anonymous, identical, pre- and post-program questionnaire assessed 15 participants' sun-knowledge, attitudes on sun prevention, and current and intended sun practices (Appendix N, O). Each participant received pre-and post-questionnaires before the session started, with one form labeled pre and the other form labeled post, which were then stapled together. This method prevented mixing of participants pre- and post-questionnaires, which allowed the participants' outcomes to be measured individually.

The project facilitator read the pre-questionnaire out loud to every student participant. Demographic data was inquired on the questionnaire, and included hair color, ethnicity/race, gender, and age. Since all ethnicities could participate in this program session, the SunWise program was contacted via email to provide a Spanish version of the questionnaire. However, it was discovered the questionnaires were only available in English, but a Spanish translator was available during the program session. Two open-ended questions about future program changes and improvements were added

to the post-questionnaire.

Geller et al. (2003b) developed the SunWise questionnaire and the SunWise program provided the permissions to use for this project. The SunWise questionnaires were pilot tested on 10 children, aged 6-7 years, and they all completed each test in less than seven minutes (Geller et al., 2003b). The questionnaires used for this project contained: five questions over demographics, four questions over sun-knowledge (two multiple choice, two true/false), 4 five-point Likert scale never/always questions, 3 four-point Likert questions never/always questions, and two multiple choice questions on current sun-practices. A total of 10 questions asked about sun attitude and perception (six yes/no, two select all, 2 three-point Likert scale questions). Lastly, 2 four-point Likert questions inquired on intent to change current sun-practices.

Secondary measures of sun protection were assessed and included: how many hours/days a week a participant spends in the sun, how often a sunburn has occurred (one, two, three times) within the last year, the perceived importance of getting a tan, and the frequency of wearing sun-protective clothing during the previous summer (never, rarely, sometimes, often, always) (Geller et al., 2002). Additionally, two, short answer questions were administered post-program to see if the program needed any future changes or improvements. Information from the participant's DermaScan viewing was not collected. The use of the DermaScan machine was merely a demonstration tool for participant's own knowledge, and was solely used as an appearance-focused activity.

Data Analysis

Data was analyzed to determine if the SunWise program session had a positive change in an individual's sun-knowledge, attitude and perception, and intent to change

current sun-practice behaviors when the questionnaires were compared pre-session to post-session. The pre-test and post-test comparison of each participant was the primary measure while the secondary measure was to see if there were any differences in sun knowledge, attitude and perception, and intent to change current sun-practice behaviors when ethnicities and genders were compared. Descriptive statistics were used to determine the individual and demographic findings of the questionnaires.

The project facilitator met with a statistician in the Biostatistical Department at the University of Kansas. Upon his suggestion, each qualitative question was coded with a numerical value, inputted into an Excel spreadsheet, and labeled “Key.” From there, all 15 participants' individual answers on the pre- and post-test were entered in a separate Excel spreadsheet using the numerical code. The Fisher Exact test was calculated for all but three questions (11, 12, 15) due to their multiple answer options. These questions were calculated by measures of central tendency. The Fisher Exact test is used to assess the significance of association between two kinds of classification (College of Saint Benedict Saint John University, 2017). Four-point Likert scale questions with the options of yes, most likely, probably not, and no, were simplified to yes/no questions with “most likely” grouped in the “yes” category, and the “probably not” grouped in the “no” category. Five-point Likert scale questions with the options of never, rarely, sometimes, often, always were simplified into three-point Likert scale questions with “rarely” grouped to the “no” category, “often” grouped to the “always” category, while the “sometimes” category remained the same.

Findings

Fifteen students returned a parental consent, signed a child assent, participated in

the SunWise program, and answered the pre- and post- questionnaires. Only one participant did not speak English, and was provided a Spanish translator for the program session and the questionnaires. Three of the 15 students previously had a school sun-protection lesson before the SunWise program was implemented, and all 15 students agreed their school does not announce the UV index.

Demographics

Participants were of varying ethnicities with two of African American descent (13%), three of Caucasian descent (20%), eight of Hispanic descent (53%), one of other descent (7%), and one participant who marked African American, Caucasian, and Hispanic (7%) (See Figure 1). None of the participants had blond or red hair color, nine participants had brown hair (60%), and six participants had black hair (40%). There were seven boys (47%), and eight girls (53%) who participated in this educational session. The participants were the typical ages for a sixth-grade student. Five students were 11 years old (33%), nine students were 12 years old (60%), and only one student was 13 years old (7%). When students were asked on the pre-test if their skin burned easily in the sun, nine out of 15 student participants did not know. Two students reported their skin burned easily, while four students said their skin did not burn easily. Interestingly, on the post-questionnaire, only five students reported they did not know if their skin burned easily, five reported their skin burned easily, and five reported their skin does not burn easily (See Figure 2).

Knowledge

Knowledge was compared pre- and post-session. Using the Fisher Exact test, three knowledge variables proved to be statistically significant pre-test to post-test: ways

to keep skin safe from the sun ($p=0.006$) (See Figure 3), cloudy days' ability to produce a sunburn ($p<0.001$) (See Figure 4), and minimum UV index number to sunburn ($p=0.008$) (See Figure 5). Therefore, students increased and retained their sun-knowledge after implementation of the SunWise session. The knowledge variable, sunscreen use at only the beach or pool, was not statistically significant ($p=0.215$) despite 13 out of 15 students who responded correctly on the post-test (See Figure 6).

Attitude & Perception

Attitude and perception regarding tanning practices were analyzed pre-test to post-test using two variables: wanting to tan ($p=0.427$) (See Figure 7), and tans looking healthy ($p=0.169$) (See Figure 8); these questions did not yield statistically significant results ($p>0.05$). Six students on the pre-test compared to three students on the post-test liked to acquire a tan. Participants reported after the session it was easier to keep themselves safe from the sun, although results were not statistically significant ($p=0.324$) (See Figure 9). The most common reason why participants did not use sunscreen was because they forgot to apply it (60%). Two male African American participants do not own any sunscreen. Two female participants, one of other descent and one of Hispanic descent, were allergic to sunscreen. Additional reasons participants did not use sunscreen was the sunscreen was either too greasy, it took too long to apply, or it was too difficult to apply (14%). Participants, including all three Caucasians, chose not to wear a hat is because they did not like to wear one (67%). One participant of Hispanic descent did not own a hat (7%) and 26% thought hats were too hot or they forgot to wear one.

Current Sun Practices

Participants reported areas on the body where sunscreen is applied. All student

participants (100%) neglected to apply sunscreen to the ears, but most of the participants who applied sunscreen applied it to the arms, shoulders, and legs (50%), with few to none who applied it to the neck and face (3%). It was found that 60% (9/15) of participants do not apply sunscreen or applied rarely (See Figure 10). Out of these nine participants who do not wear sunscreen, five acquired one or more sunburns, with three participants reporting these sunburns were painful. Only three participants (20%) often or always applied sunscreen. One of these participants was a Hispanic male and did not experience sunburns, one was a Hispanic female that experienced at least one sunburn, and one was a Hispanic female that experienced three or more sunburns. Three participants reported they sometimes wore sunscreen.

Participants were more likely to remind a sibling to apply sunscreen (40%), than remind a friend to apply sunscreen (20%). Seven students (47%) have reminded an adult to put sunscreen on them, while five students have (33%) reminded an adult to apply sunscreen to themselves. Thirteen out of 15 students spent at least four days a week, for an average of three to four hours, playing outside last summer. It was found that 11 participants (73%) never or rarely wore a hat, 12 participants (80%) never or rarely wore a long sleeve shirt, and only five participants (42%) wore sunglasses.

Intent to Change

The intent to change current sun practices among adolescents was assessed pre-test and post-test using two variables: intention to play in the shade ($p=0.025$) (See Figure 11), and intentions to apply sunscreen ($p=0.021$) (See Figure 12). There was a statistically significant difference in both questions when compared pre-test to post-test, demonstrating the SunWise session did have a positive impact on the intent to change

their sun practices in the future. Intentions to play in the shade increased from 33% to 80% and intentions to apply sunscreen increased from 40% to 87%.

Participant Comments

Attached to the post-questionnaire were two, optional short-answer questions which inquired what the participants enjoyed about the sun presentation activity, and what would they change. Some positive answers included, “I realized I need to wear more sunscreen,” “I liked the sun relay race,” “The presentation was cool and good,” and “Nothing needs to be changed.” One participant suggested, “to make the presentation shorter.” An optional three-point Likert question asked if participants knew more about sun protection and UV light than before the SunWise session; all but one participant (93%) felt they knew more after the session.

Discussion

With national recommendations urging schools to promote sun safety education in the classroom setting, this 90-minute SunWise session resulted in improvements of adolescents' sun-knowledge and intentions to practice sun-safe behaviors, which is congruent with other studies (Buller et al., 2006; Davis et al., 2015; Sancho-Garnier, 2012; White et al., 2010). This DNP project revealed that adolescent participants, pre-session, displayed a lack of perceived severity of acquiring sunburns when answering knowledge-type questions, which is similar in other studies (Ashioff et al., 2009; Davis et al., 2015; Lazovich et al., 2004; Woodgate et al., 2015). As participants gained and retained sun-knowledge from the SunWise session, their outlook on the severity and seriousness of sun protection increased. As several participants were unaware if their skin burned easily in the sun, this could indicate they did not feel susceptible to the

repercussions of underutilizing sun protection measures. The high rate of occurrences of sunburns in this project correlate with the Geller et al. (2002) and the Olson et al. (2007) studies. Like the Geller et al. (2002) study, the participants in this project who had lighter hair color knew what type of SPF they applied.

Results comparing tanning attitudes and perceptions, pre- and post-test, did not yield a statistical difference, much like the Davis et al. (2015) study. On the pre- and post-test, over half of the participants did not like to tan, and did not think people looked healthier with a tan. An explanation for this could be that Hispanic was the prevalent ethnicity in this project, and these adolescents have a darker skin color. However, a Fitzpatrick skin type analysis was not completed on participants during this session, so it is unknown how pigmented their skin is. In other studies, where Caucasians have been the most prevalent ethnicity, results have revealed Caucasians tend to seek a darker complexion and are therefore more likely to participate in tanning activities (Geller et al., 2002; Glanz et al., 2002; Sancho-Garnier, 2012; White et al., 2010). Although some participants reported post-session keeping their skin safe from the sun is easy, most participants reported it is not too hard of a task, but also not an easy one. A lack of sunscreen application and wearing a hat were the main perceived barriers to sun protection in this project and in other studies (Buller et al., 2006; Geller et al., 2002; Holloway & Galvin, 2013). Most participants stated they did not like the idea of wearing a hat, and they forget to apply sunscreen or it was too greasy.

The intention of participants to practice sun-safe behaviors post-session, when there was no intention of practicing sun-safe behaviors pre-session, may reveal that participants see a perceived benefit to protecting themselves from the sun in the future.

The participant's willingness to apply sunscreen and play outside in the shade post-intervention is also indicated in other comparable studies (Buller et al., 2006; Davis et al., 2015; Geller et al., 2002, Munden, 2013). It is unknown in this project what influenced a change in the participant's response. It is unlikely their attitude regarding sun-safe measures had an influence as this outcome measure was proven to be insignificant. The session contained attitude and knowledge-based components, which makes it difficult to pinpoint the influence.

The project facilitator had five assumptions prior to the implementation of this project. Four of the five assumptions were found to be statistically significant. These include: the facilitator assumed that a student's sun-based knowledge would increase following the educational program intervention, students would encounter a positive, change in perceptions and attitudes regarding sun awareness following the educational program intervention, students would display an intent to change in sun-protective behavior immediately following the educational program intervention, most of the students in this study would be in the age range of 11-12 years old, and many primary middle schools do not implement a sun education program or adhere to the CDC's evidence-based guidelines for school sun safety. One assumption was not of statistical significance: students would encounter a positive change in perceptions and attitudes regarding sun awareness following the educational program intervention.

There were several limitations in this project. First, this project had a very small sample size, which limits generalizability; it was implemented in one middle school, and in one sixth grade science class. Including a Fitzpatrick skin analysis within the session, which classifies a person's skin type and risk for sunburn, would have provided

beneficial information to the participants and strengthened demographic data. The program session was a one-time, 90-minute session that assessed immediate changes in knowledge, attitude, and intent to practice sun-protective behaviors. It is also difficult to measure an actual change in sun protection practices over a short period. Therefore, the student's intention to change was measured, which is shown to be a good predictor of actual behavior (Arthey & Clarke, 1995). Participants were not reassessed; it is unknown the length of time an intent to change behavior lasted or how much knowledge was retained long-term. Unable to rely on objective measures of adolescent sun-practices, subjective measures of self-report were collected. Subjective data is at risk for recall errors of underreporting, overreporting, and social desirability tendencies. It is also unreasonable to expect that school sun-education programs alone will produce drastic improvements in adolescents' using sun protection methods. Finally, as the SunWise study states, the questionnaires do not include a complete comprehensive set of knowledge and attitude questions due to the limited time constraint of the overall program (Geller et al., 2002).

Conclusion

Overall, the findings of this project support the need for primary middle schools to incorporate multi-faceted, sun-protection education within the classroom setting, as 60% of adolescents did not use sunscreen, but following the session 87% said they would. Education should focus on ways to improve knowledge, attitude, and behavior regarding the perceived severity, susceptibility, barriers, and benefits of sun protection measures among the adolescent population. However, future research should investigate why adolescents' perception and attitudes do not change, despite their increase in

knowledge and willingness to change current sun-practices. Prior to implementation, 60% stated they would not apply sunscreen the coming summer, compared to 13% following the implementation. Pre-session, 33% of adolescents stated they would play in the shade the coming summer, compared to 80% of adolescents post-session. After participating in SunWise session students made comments such as, “I realized I need to wear more sunscreen,” “I liked the sun relay race,” and “The presentation was cool and good.” One participant suggested, “to make the presentation shorter.” Ninety-three percent of the participants know more about sun protection and UV light following the SunWise session.

Summary

Primary middle schools are not implementing sun awareness and prevention evidence-based guidelines that aim to reduce the risk and number of adolescents acquiring skin cancer, despite the increase of melanoma and non-melanoma skin cancers worldwide (CDC, 2015; KDHE, 2012; USDHSS, 2014; WHO, 2016). Through various school-based sun education pilot studies, as well as through established and nationally recognized school sun-education programs, adolescents have shown an increase of sun prevention knowledge after program completion than before program initiation. Adolescents' intent to change current sun practices have shown to have a minimal to moderate positive effect when program content includes a multi-faceted approach (Buller et al., 2006; Davis et al., 2015; Mulden, 2013; Olson et al., 2007).

A call to action was identified, and a nationally recognized sun-education program was implemented for adolescents in a Kansas middle school, sixth-grade science class. After a 90-minute interactive presentation, participants were surveyed to determine

if there was increase of knowledge and a change in attitude and behavior concerning safe sun practices. Collected data was extracted, synthesized and compared to the findings in supporting literature and evidence-based recommendations. It was discovered there was an increase in adolescents' knowledge and intent to change current sun-practices, but there was no effect on change in attitude and perception about sun protection. Future research should investigate why adolescents' perception and attitude do not change, despite an increase in knowledge and willingness to change current sun-practices.

Findings were disseminated among the middle school principle, vice principle, and sixth-grade teachers during a collaborative planning in-service. Many teachers and both the principle and vice principle were surprised by the adolescents' increase and retention of sun-knowledge, and their strong intent to practice sun-protective behaviors following the SunWise session. Sample SunWise activities were shown to the teachers, with many commenting on the simplicity of incorporating these activities into lesson plans. Not one educator had heard of the SunWise program, and did not know it was free to download. The project facilitator offered to be a consultant, and help initiate the SunWise session to the entire middle school; the vice principle agreed there was a benefit to initiating this program and suggested starting implementation one grade-level at a time.

Figures

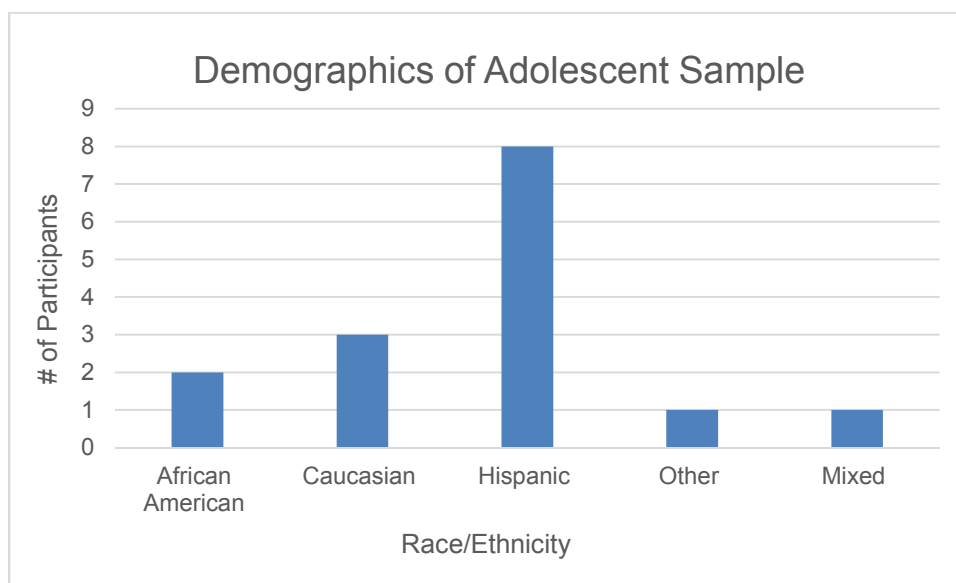


Figure 1. Demographics depicting race and ethnicity of the selected adolescent sample population.

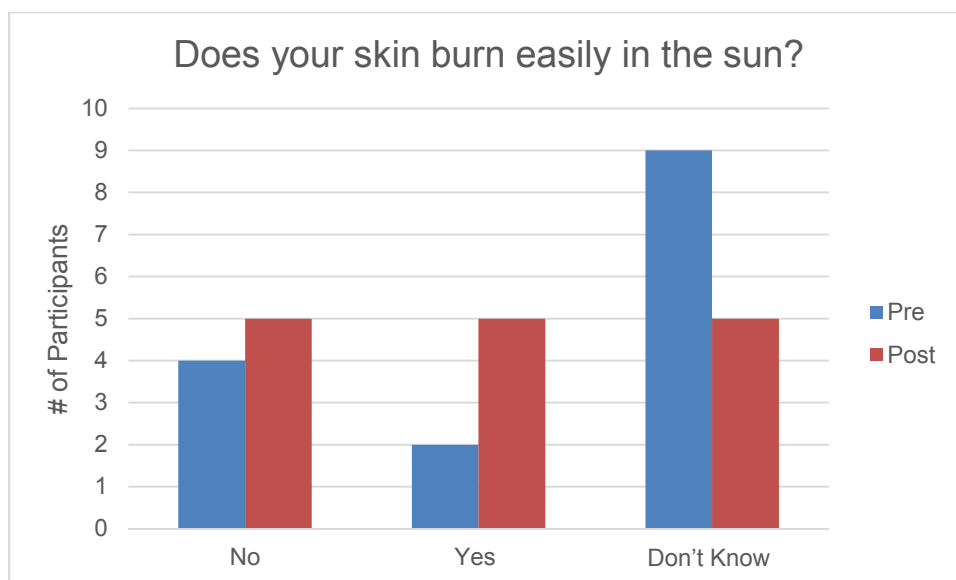


Figure 2. Pre-test and Post-test comparison of participants perception on how likely they sunburn.

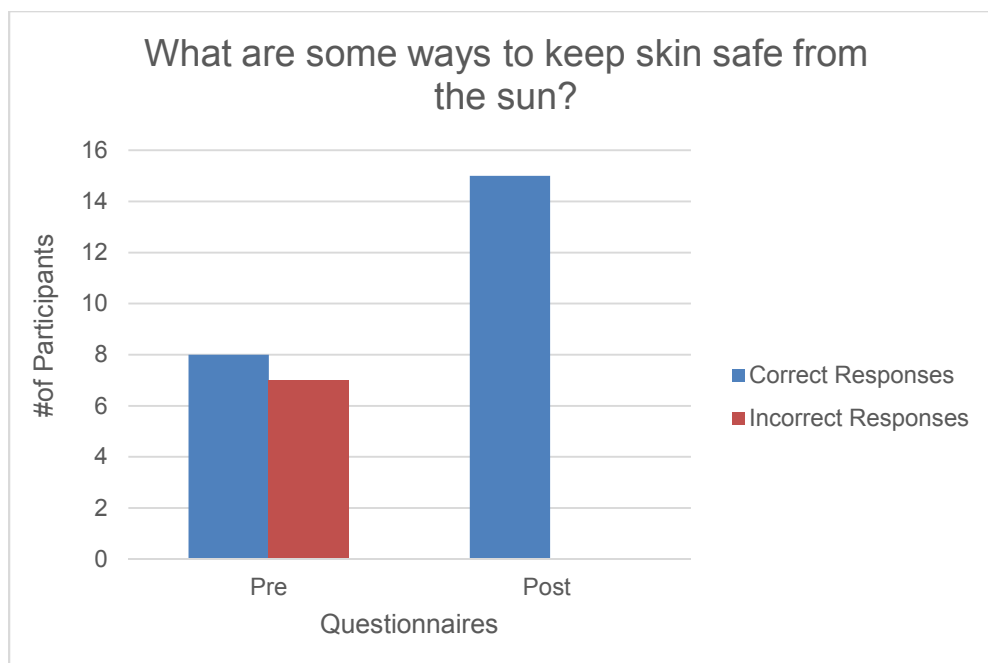


Figure 3. Pre-test and Post-test comparison of knowledge question. Correct responses included: wearing sunscreen, a shirt, and a hat. The incorrect response was eating cereal.

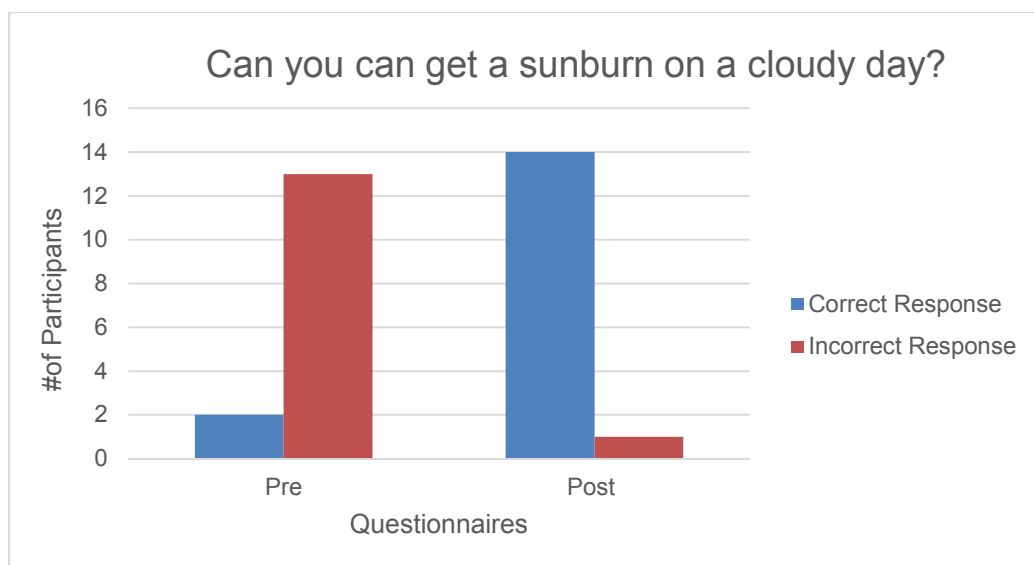


Figure 4. Pre-test and Post-test comparison of a knowledge question. Correct response was yes; incorrect response was no.

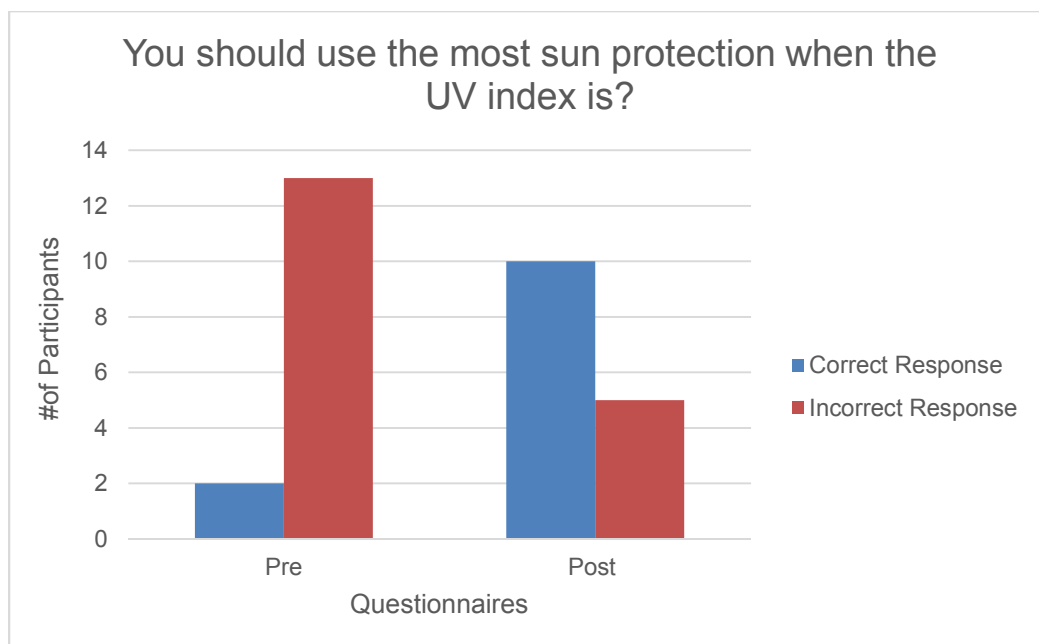


Figure 5. Pre-test and Post-test comparison of a knowledge question. Correct response was UV index of 5; incorrect responses included: 1, 10 or higher, or unsure.

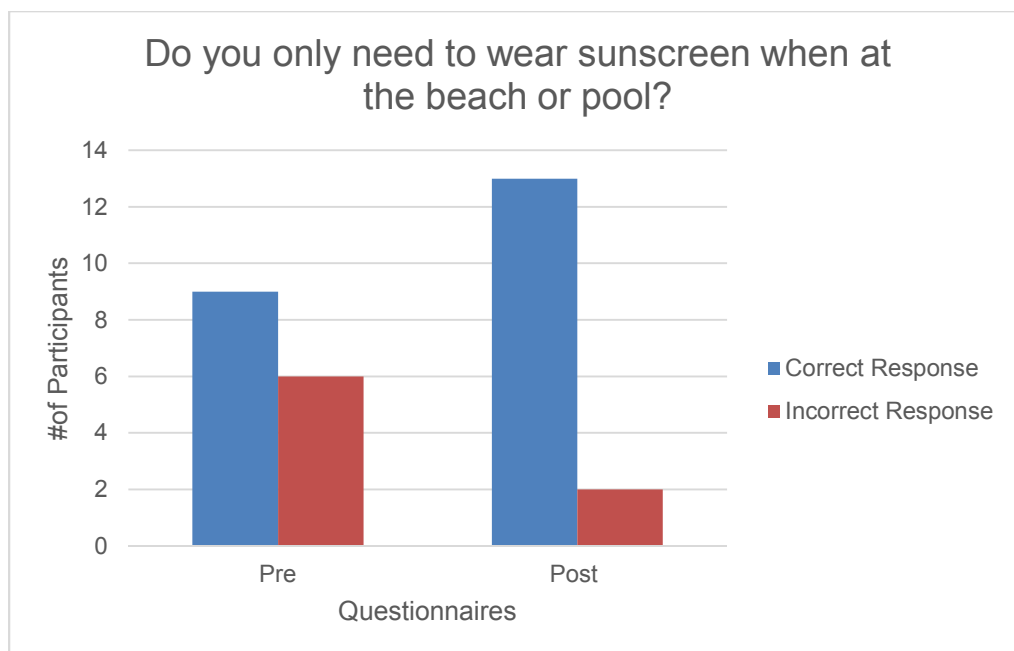


Figure 6. Pre-test and Post-test comparison of a knowledge question. Correct response was no; incorrect response was yes.

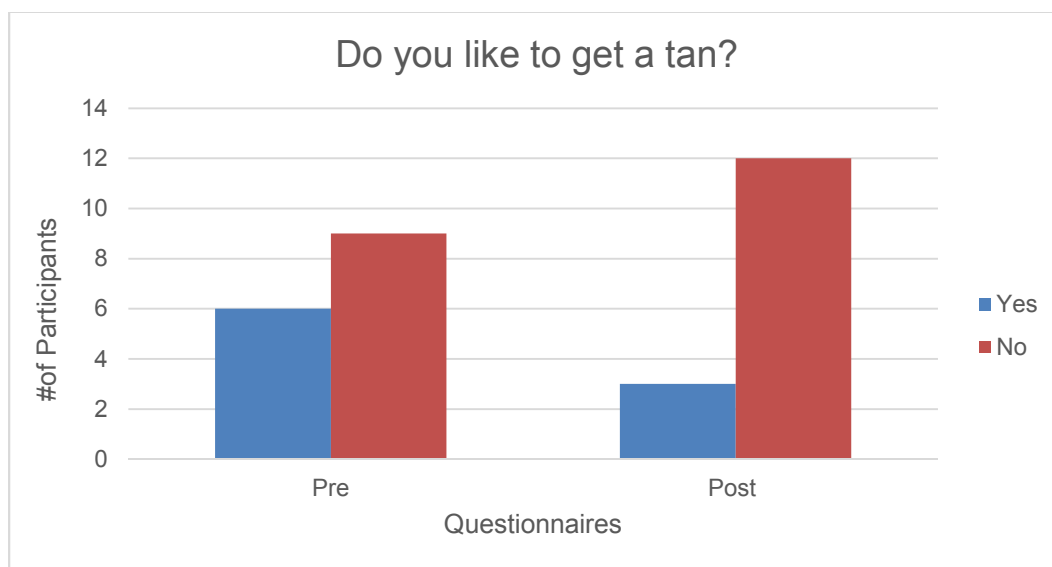


Figure 7. Pre-test and Post-test comparison of an attitude and perception question.

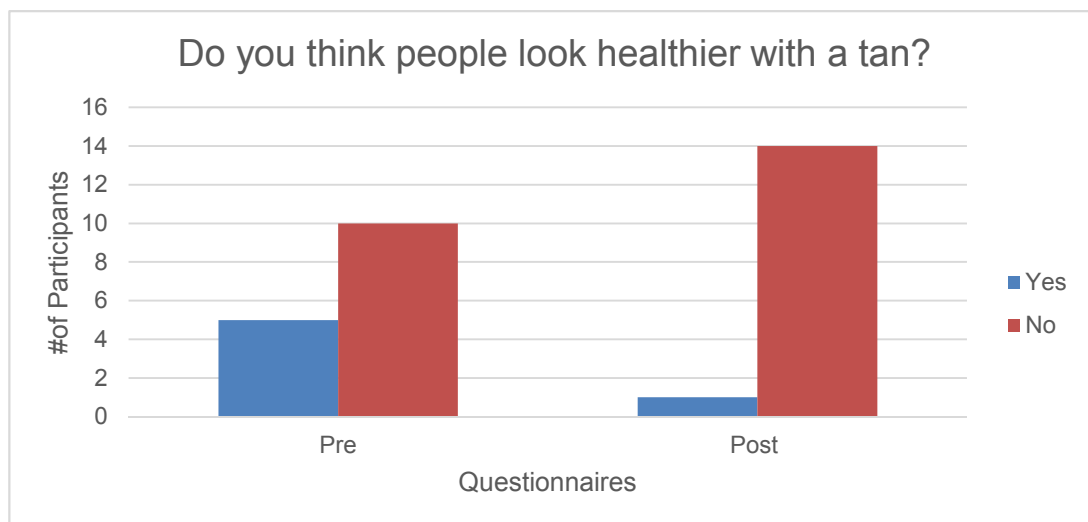


Figure 8. Pre-test and Post-test comparison of an attitude and perception question.

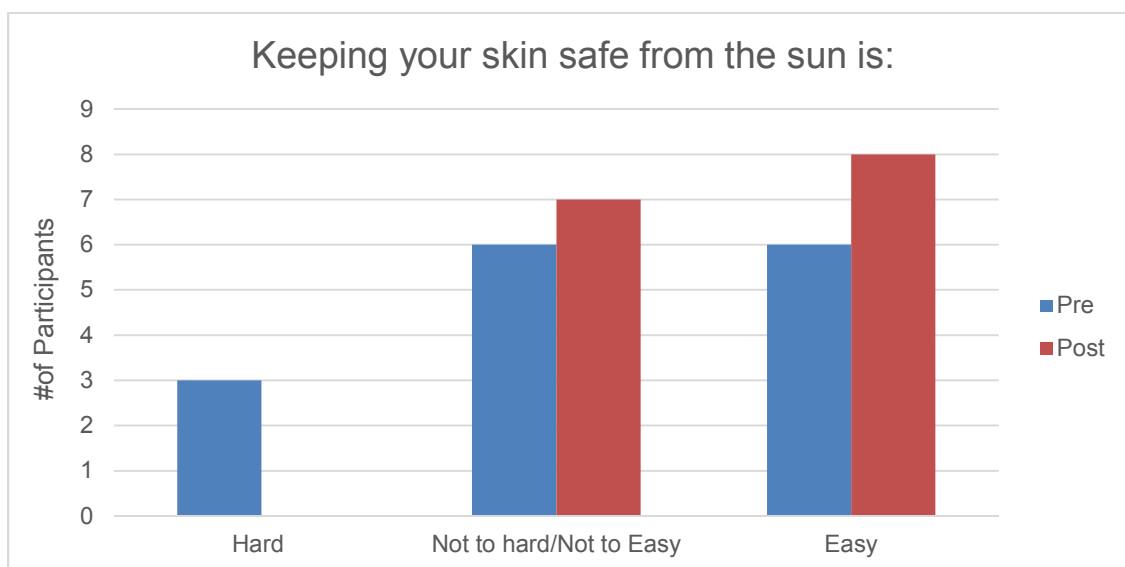


Figure 9. Pre-test and Post-test comparison of an attitude and perception question.

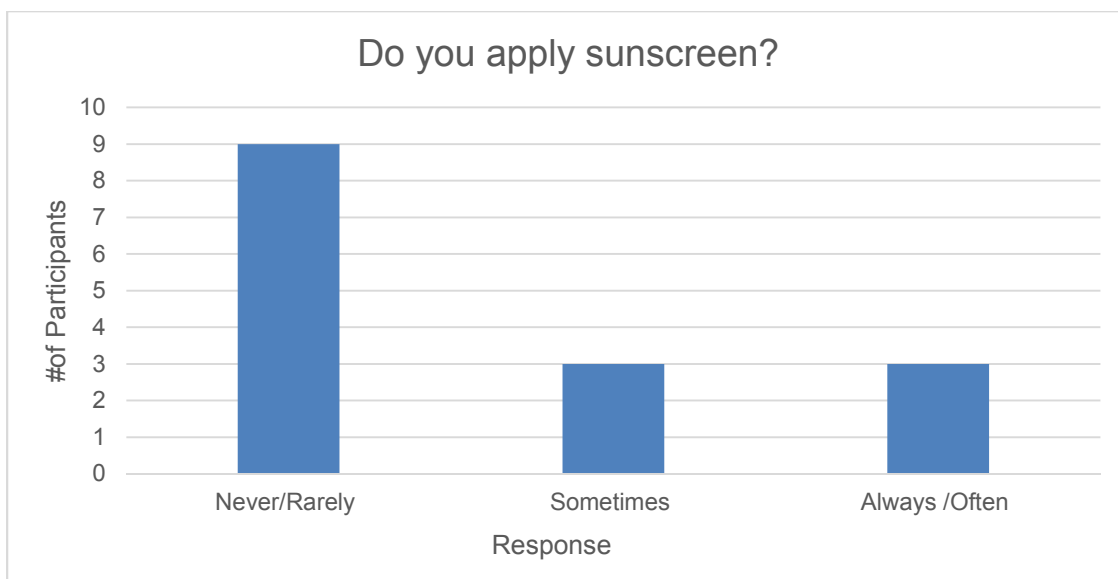


Figure 10. Adolescent population of their current sunscreen use.

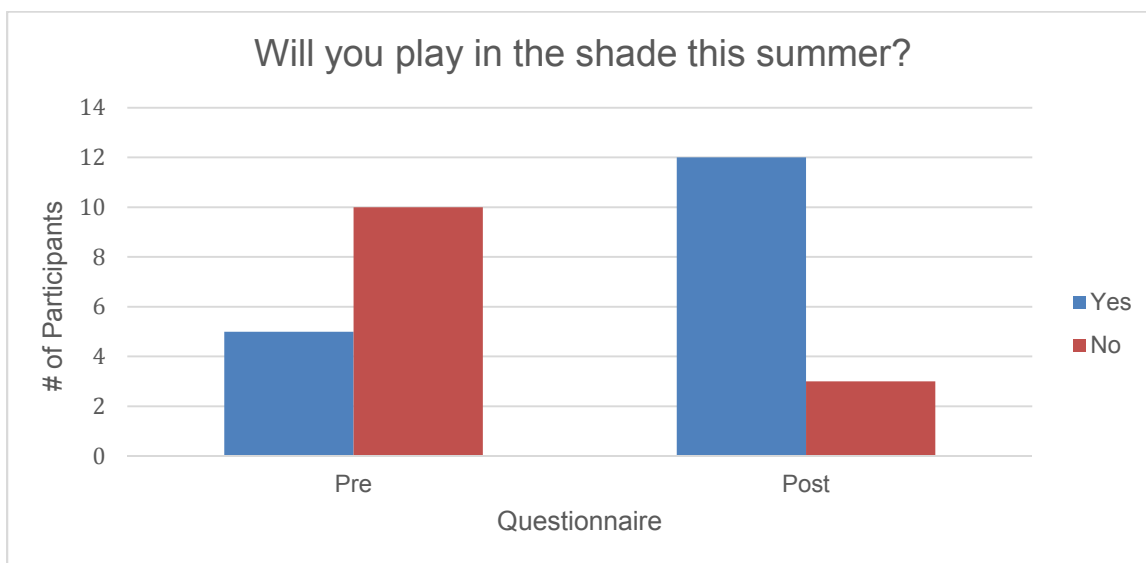


Figure 11. Pre-test and Post-test comparison of the intent to change current sun practice behavior, regarding playing in the shade this coming summer.

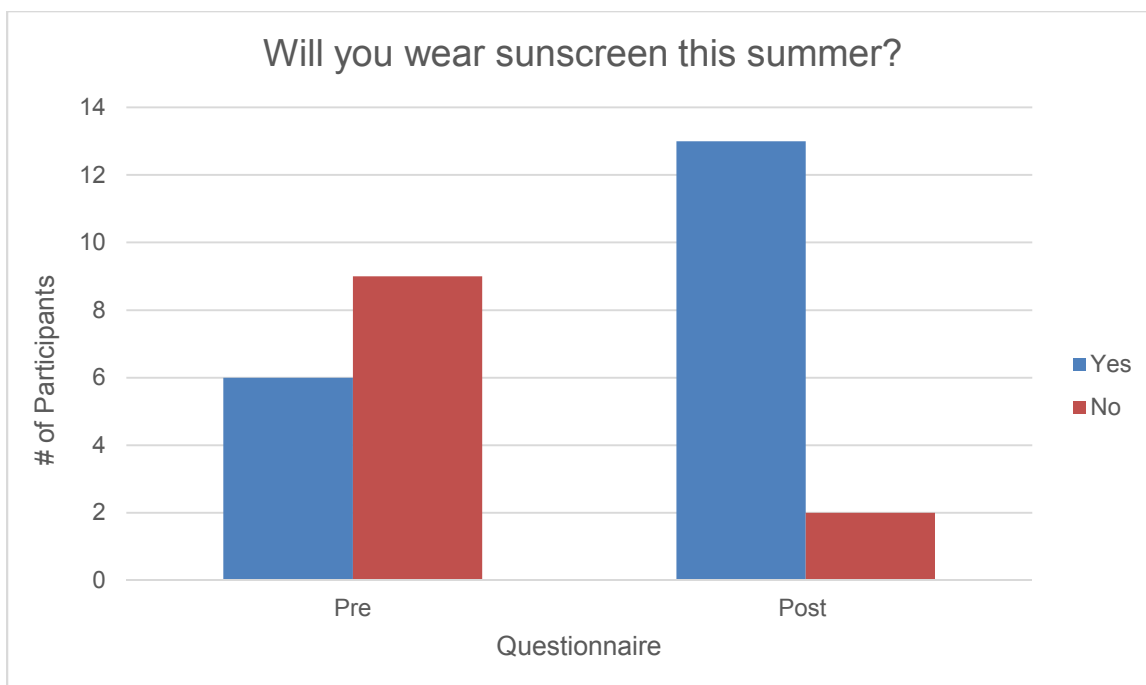


Figure 12. Pre-test and Post-test comparison of the intent to change current sun practice behavior, regarding sunscreen use this coming summer.

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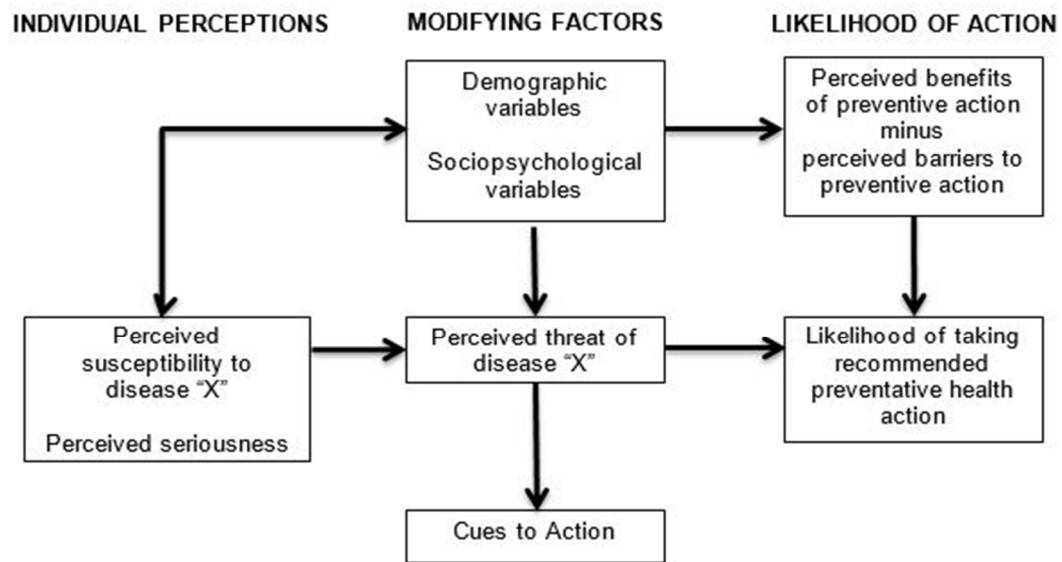
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Appendix A: Health Belief Model



Health Belief Model, Becker & Janz 1985

Appendix B: Human Subjects Quality Improvement Confirmation

KUMC HUMAN SUBJECTS COMMITTEE

REQUEST FOR QUALITY IMPROVEMENT/QUALITY ASSURANCE DETERMINATION

****THIS FORM MUST BE TYPED****

Project Leader: Dr. Joann Peterson

Department: University of Kansas School of Nursing

Email: jpeterson2@kumc.edu

Phone: 913-588-1645

Alternate Contact Person (e.g., Project Coordinator): Amanda Merino

Email: amerino3@kumc.edu

Phone: 913-706-7434

Project Title:

A QUALITY IMPROVEMENT PROJECT: IMPEMETING THE SUNWISE EDUCATION PROGRAM IN MIDDLE SCHOOL ADOLSCENTS

Project Number, Version and/or Date:

February 2017

1. Briefly state the purpose of the proposed project. (*Attach project plan if available.*)

Evidence has shown that skin cancer is a growing national concern and education on sun safety should begin in childhood (Buller et al., 2006; CDC, 2014; Davis et al., 2015). The aim of this DNP project is to implement the SunWise program which is a multidimensional, interactive, sun safety education intervention that provides evidence-based recommendations and guidelines for sun protection. This program promotes safe sun practices and sun knowledge so children and adolescents can make informed decisions when spending time outdoors or considering artificial tanning. Surveys will assess knowledge, general sun protection attitudes, and current sun practices and will be given before and immediately after the intervention, serving as the outcome measure. The development of the project and data findings will be publicly presented. The following PICOT question will be evaluated: Among sixth grade students in an urban, middle school does implementing the multidimensional sun safety education program, SunWise, impact retention of sun safety knowledge, perceived attitude, and intent to change behavior of current sun practices following the completion of the program, compared to the knowledge, attitude and behaviors within the students prior to the implementation of the SunWise program?

2. **Describe the research that has already demonstrated the effectiveness of your intervention. (Cite research and/or attach documentation about the national program or standard you are implementing)**

Environmental and healthcare organizations are developing and promoting new sun-safe practice strategies aimed at children to prevent and to decrease the risk for acquiring skin cancer later in life (American Melanoma Foundation [AMF] 2015; CDC, 2016; Skin Cancer Foundation, 2016). A call to action to reduce risky sun practices among adolescents, Goal 2, strategy 2B, encourages schools, particularly Kindergarten through eighth grade (K-8), to incorporate sun safety education in the academic curriculum (USDHHS, 2014). In 2002, the Morbidity and Mortality Weekly Report (MMWR) in collaboration with the CDC released the "Skin Cancer Prevention Guidelines" urging school programs to utilize this report to further reduce the risk of skin cancer development among students (Glanz, Saraiya, & Wehlser, 2002). Within the past few years, U.S. and international school-based sun safety educational programs have proven to be successful in increasing sun knowledge and intent to practice sun safety. These evaluation studies have yielded significant evidence signifying the need for sun- safe practice education in all ages of children and adolescents in primary education (CDC, 2016; The Community Guide, 2014; USDHHS, 2014; WHO, 2016). Currently, there are at least seven known sun safety school programs in the U.S.; however, many schools are underutilizing these established programs and their resources.

3. **What types of data are needed for the project?**

This project will be qualitative data. The SunWise pre-and-post program questionnaire will be used for this project, and approval has been given by the SunWise program. Pre- and post-program questionnaires will be read aloud to each participant by the DNP student, project facilitator. Each participant will be assigned their own unique identification number, to link pre-and post questionnaires to the same participant., but will still remain anonymous. The anonymous, questionnaires will contain 2, true/false/not sure, sun-knowledge questions, four, five-point Likert scale never/always questions, eight, four-point Likert questions, three, three-point Likert questions, and nine, yes/no questions on sun perception and current sun practices. Secondary measures of sun protection that will be assessed include the frequency of lying in the sun to achieve a tan, how often a sunburn has occurred (one, two, three times), perceived importance of getting a tan, and wearing sun-protective clothing during the previous summer (never, rarely, sometimes, often, always). An additional, two short answer question form will be administered post-program inquiring to see if the program was enjoyable and informative, and assess ways to improve the program for future students. Questions that are asked are sun knowledge-based, attitudes regarding sun-safe practices, and intent to change current sun practices. Demographic data (hair color, ethnicity/race, age, gender) will be collected both pre- and post- questionnaire.

4. **Do you need access to identifiable patient records to complete the project?**

☒ NO
☐ YES

If yes, who holds the records? _____

If yes, which patient identifiers or demographics are needed for the project?

5. Which descriptions best fits your project? Check all that apply:

- ☐ Determine if a previously-implemented clinical practice improved the quality of patient care
- ☒ Evaluate or improve the local implementation of widely-accepted clinical or educational standards that have been proven effective at other locations
- ☐ Gather data on hospital or provider performance for clinical, practical or administrative uses
- ☒ Conduct a needs assessment to guide future changes in local health care delivery or to support other improvements at KUMC
- ☐ Perform an analysis to characterize our patient population/clients to improve quality of services
- ☐ Implement programs to enhance professional development for providers and trainees
- ☐ Measure local efficiency, cost or satisfaction related to standard clinical practices
- ☒ Develop interventions or educational strategies that improve the utilization of recognized best practices
- ☐ Implement strategies to improve communication within our local healthcare environment
- ☐ Improve tools for patients that promote education, health literacy or treatment plan compliance

6. Does your project involve any of the following aspects? Check all that apply:

- ☐ Randomizing participants into two or more groups
 - ☐ Student/residents/trainees are randomized
 - ☐ Patients are randomized
 - ☐ Healthcare providers are randomized
 - ☐ Units of the hospital are randomized
 - ☐ Other *Specify:*
- ☒ Surveying a patient population
- ☐ Developing clinical practice guidelines
- ☐ Developing new curriculum recommendations
- ☐ Developing or refining a new assessment tool
- ☒ Implementing a novel approach to care that may improve patient outcomes

7. Which institutions are involved in the project?

- ☒ KUMC only

☒ Other institutions List Arrowhead Middle School, Kansas City, Kansas

8. Which individuals or groups will receive the results of your project?

- ☐ Internal department personnel
☐ Hospital representatives
☐ University representatives
☒ Presentation/publication*
☐ Other Specify _____

9. How will your results be used to implement local improvements?

Pre- and post- implementation of the SunWise school program the adolescent participants will answer a knowledge and attitude based questionnaire. The outcomes, which will be measured, include, knowledge of sun safety, perceived attitudes of sun-safety and protection, and intent to practice sun-protective behaviors. After completion of the SunWise program session adolescents will also evaluate the effectiveness of the program and can offer suggestions and recommendations to better enhance the program for future students.

Other states across the nation have successfully implemented the SunWise program and national evidence based guidelines recommend sun prevention education throughout the school years. Currently, in Kansas City, school districts do not implement sun-based education into the curriculum. Implementing the SunWise program in a Kansas City middle school will help promote the need for sun education locally and throughout this age group and will help increase sun protection knowledge and increase intent to change sun risky practices.

Signature**

Date

Type/Print Name

*Any presentation or publication resulting from this project should explicitly state that it was undertaken as quality improvement.

**Ink signature or email from the project leader is required.

Q.I. Confirmation

FOR OFFICE USE ONLY

Quality Improvement Determination Acknowledged. IRB review is not required.

2/24/17

Appendix C: Permission Letter to Implement Program**Arrowhead Middle School**

1715 N. 82nd St. Kansas City, KS 66112
(913) 627-6600 Fax: (913) 627-6654

WWW.KCKPS.ORG

To whom it may concern:

Amanda Merino has permission to implement her quality improvement Doctor of Nurse Practitioner project at Arrowhead Middle School in Mrs. Bachkora sixth grade science class on March 30th 2017.

Thank you,

[Redacted Signature]
Nancy Hale
Arrowhead Middle School Vice Principle

[Redacted Signature]
Molly Bachkora
Arrowhead Middle School Science Teacher

Appendix D: Parenteral/ Guardian Note for Concerning Lesion

Your child had a DermaScan Visual Face Analyzer performed today 03/30/17. This was performed for educational purposes only and is NOT a screening test. This machine shows sun damage and over-exposure to the sun, as well as dry areas, oily areas, and dark spots. These DermaScan results do not indicate your child has nor are they at risk for skin cancer. Sun-damage can be reversed and prevented by applying sunscreen as well as other sun-safety habits which were discussed today. Today your child shows:

____ **None/Minimal Sun-damage and overexposure**

Recommendation: Continue applying sunscreen with a SPF 15 or SPF 30, re-apply every 2 hours

____ **Minimal/Mild Sun-damage and overexposure**

Recommendation: Continue applying sunscreen with a SPF 15 or SPF 30, re-apply every 2 hours

____ **Mild/Moderate Sun-damage and overexposure**

Recommendation: Continue applying sunscreen with a SPF 15 or SPF 30, re-apply every 2 hours

____ **Moderate/Severe Sun-damage and overexposure**

Recommendation: Continue applying sunscreen with a SPF 15 or SPF 30, re-apply every 2 hours. May benefit from a Total Body Skin Exam from a pediatrician, family practice provider or dermatologist.

Appendix E: Parenteral Permission Letter for Child Participation

PARENTAL/GUARDIAN CONSENT FORM

PLEASE SIGN & RETURN BY 03/30/2017

Title: Implementing the SunWise Safety Education Program in Middle School
Adolescents

Project Coordinator: Amanda Merino, RN, BSN, DNP student, University of Kansas
School of Nursing

I, _____ (print), understand that I am
being asked to grant permission for my child,

_____ (print), to participate in an educational project for eighth grade middle school students which will measure the effects of the sun safety program, SunWise, on students' knowledge, attitudes and perceptions, current sun practices, and intent to change current sun behavior practices.

The project is based on recommendations and evidence-based guidelines from the Center for Disease Control, Environmental Protection Agency, and the World Health Organization to start educating younger generations about skin cancer prevention and sun protection. The project will include a one-hour interactive session, during a designated science class in the spring of 2017. The session will focus on the damaging impact sun exposure has from both a health-based and appearance-based perspective. The session will include a PowerPoint presentation, a short video featuring an adolescent melanoma survivor, an active learning discussion, and group activities, which will all be provided through the SunWise toolkit. Adolescent participants will have the option to view their face by looking into a DermaScan device, which analyzes the skin for over-exposure from the sun. The Federal Drug Administration (FDA) approves the light that is used in the DermaScan device, as fluorescent light bulbs do not carry a warning for use. The project coordinator will administer a pre-and post-questionnaire to participants, which will take less than 10 minutes to complete. The questionnaire will inquire about current sun knowledge, current sun-safe practices, an intent to change current practices, and how to improve this program for future students. The pre- and post- questionnaires will remain anonymous. Demographic data (age, gender, hair color, ethnicity/race) will be collected. The questionnaires will be collected at the end of the session for data purposes.

There are no known risks for your child to participate in this project as no procedures or invasive tests will occur. As this is an education project, intended to increase participants' knowledge on sun protection and sun risks, an unplanned effect could include participants partaking in extreme measures to protect themselves from the sun or experiencing excessive worrying about the sun.

Please check all lines below as you understand:

___ There is no cost for your child to participate in this project.

___ Your child or you will not be compensated for participating in this project.

___ Your child will not be penalized, if he/she does not participate and can leave the program session at any time.

___ I will allow photographs of my child participating in activities and give permission for them to be used during a presentation at the University of Kansas (note: names of participants photographed will remain confidential).

___ My child will also be given a child assent form stating that they too have consented to participating in this project.

___ I consent to my child viewing his/her skin using the DermaScan, and I understand it is optional. If my child or the school nurse has any concerns about my child's skin they will contact me for further recommendations.

___ For my child to participate in this session I must give parenteral consent AND my child has to give child assent.

I have read and understand the parental consent including the risks, benefits, program outline, and data collection measures. I have checked all the lines above, and I give my consent and my child's consent to participate in this project. If I have any additional questions I will contact Amanda Merino, RN, BSN, DNP student at 913-706-7434 or via email at amerino3@kumc.edu.

Signature of Parent/Guardian

____/____/____
Date

Signature of Project Coordinator

____/____/____
Date

Appendix F: Parenteral Permission Letter for Child Participation (Spanish)

LOS PADRES FORMA / TUTOR CONSENTIMIENTO

POR FAVOR FIRME Y VUELTA POR 03 / 30 / 2017

Yo, _____ (impresión), entiendo que soy
se les pide que conceda permiso a mi hijo,

(Impresión), para participar en un proyecto educativo para los estudiantes de la escuela secundaria de octavo grado que lo hará medir los efectos del programa de protección contra el sol, SunWise, el conocimiento de los estudiantes, actitudes y percepciones, prácticas actuales de sol, y su intención de modificar las prácticas actuales de comportamiento sol.

El proyecto se basa debido a las recomendaciones y directrices basadas en la evidencia desde el Centro de Control de Enfermedades, la Agencia de Protección del Medio Ambiente y la Organización Mundial de la Salud para empezar a educar a las generaciones más jóvenes sobre la prevención del cáncer de piel y protección solar. El proyecto incluirá una sesión interactiva de una hora, durante una clase de Ciencias designado en la primavera de 2017. La sesión se centrará en la exposición al sol tiene impacto perjudicial tanto desde una perspectiva basada en la apariencia basada en la salud y. La sesión incluirá una presentación de PowerPoint, un breve vídeo que ofrece un superviviente del melanoma adolescente, un debate aprendizaje activo y las actividades de grupo que todos conseguirse gracias a la kit de herramientas de SunWise. adolescentes participantes tendrán la opción de ver su cara mirando en un dispositivo DermaScan, que analiza la piel de la sobreexposición al sol. La Administración Federal de Drogas (FDA) aprueba la luz que se utiliza en el dispositivo DermaScan, como las bombillas fluorescentes no llevan una advertencia para su uso. El coordinador del proyecto administrará un pre-y post-cuestionario a los participantes, que se llevará a menos de 10 minutos en completarse. El cuestionario indagará sobre el conocimiento actual del sol, las prácticas actuales de sol-seguro, la intención de cambiar las prácticas actuales y cómo mejorar este programa para los futuros estudiantes. Los cuestionarios pre y post van a permanecer en el anonimato. Se recogieron datos demográficos (edad, género, color de pelo, la etnia / raza). Los cuestionarios serán recogidos al final de la sesión con fines de registro.

No existen riesgos conocidos para que su hijo participe en este proyecto como no hay procedimientos o pruebas invasivas ocurrirán. Como se trata de un proyecto educativo, destinado a aumentar el conocimiento de los participantes sobre la protección del sol y los riesgos del sol, un efecto imprevisto podría incluir participantes que toman parte en las medidas extremas para protegerse del sol o que experimentan excesiva preocuparse por el sol

Por favor, compruebe todas las líneas de abajo y cuando usted entienda:

___ Hay Hay ningún costo para su hijo participe en este proyecto.

___ Su niño o que no serán compensados por participar en este proyecto.

___ No se penalizará su hijo, si él / ella no participa y puede dejar la sesión del programa en cualquier momento.

___ Me Permitirá fotografías de mi hijo que participan en actividades y dar permiso para que sean utilizados durante una presentación en la Universidad de Kansas (nota: los nombres de los participantes fotografiados será confidencial).

___ Mi Niño también se le dará un formulario de consentimiento declare que el niño que ellos también han dado su consentimiento para participar en este proyecto.

___ Doy mi consentimiento para que mi hijo ver su piel usando la DermaScan, y entiendo que es opcional. Si mi hijo o la enfermera de la escuela tiene alguna preocupación sobre la piel de mi hijo se pondrán en contacto conmigo para más recomendaciones.

___ Para Que mi hijo participe en esta sesión he de dar su consentimiento parenteral y mi hijo tiene que dar su asentimiento niño.

He leído y entendido la autorización de los padres incluyendo las medidas de los riesgos, beneficios y esquema del programa de recolección de datos. He comprobado todas las líneas anteriores, y dar mi consentimiento y el consentimiento de mi hijo a participar en este proyecto. Si tengo preguntas adicionales que se pondrá en contacto Amanda Merino, RN, BSN, estudiante DNP al 913-706-7434 o por correo electrónico aamerino3@kumc.edu .

_____/_____/____/____/____

Firma del padre / tutor Fecha

_____/_____/____/____/____

Firma del Coordinador del Proyecto Fecha

Appendix G: Child Assent Letter for Participation

CHILD ASSENT FORM

Title: Implementing the SunWise Safety Education Program in Middle School
Adolescents

Project Coordinator: Amanda Merino, RN, BSN, DNP student, University of Kansas
School of Nursing

Dear sixth grade student,

You are being asked to participate in a 1-hour sun education and protection activity. Your parent/guardian has said that it is okay for you to participate in this activity. If you choose to participate I will ask you a few questions before and after the activity. These questions will ask about your usual sun safety habits and sun knowledge. These questions are short, and will not take any longer than 5-10 minutes to finish.

There are no wrong or right questions, this is not a test; I would like to know what you think.

This activity will be held during a science class and is optional which means you are not required to participate.

You will have the option of looking at your skin under a special light. This light does not hurt you, but highlights any areas on your face that have had too much sun. This does not mean you have skin damage or skin cancer or that you will get skin cancer later in life; it only shows areas where too much sun exposure has occurred. You do not have to participate in this activity, and you still can participate in the others.

You can ask any questions about this activity. If you decide not to finish the activity, you may ask to leave at any time.

Being in this sun activity project is up to you. If you sign your name on the line, it means you want join in on the sun education activity. If you do not want to be in this activity, do not sign your name. You do not have to participate in the activity, even if you sign your name today. No one will be upset if you do not sign your name or if you change your mind later. If you do not want to participate at any time you need to tell your mom or dad, the science teacher, the school nurse, or the project leader, Amanda Merino.

Sincerely,
Amanda Merino RN, BSN
Doctorate of Nursing Practice student

Your Signature

Date

Appendix H: Child Assent Letter for Participation (Spanish)

NIÑO FORMA ASENTIMIENTO

Estimado estudiante de sexto grado,

Se le está pidiendo a participar en una actividad de educación y la protección del sol de 1 hora. Su padre / tutor ha dicho que está bien para que usted participe en esta actividad. Si decide participar voy a hacerle algunas preguntas antes y después de la actividad. Estas preguntas le preguntará acerca de sus hábitos de protección solar y conocimientos habituales sol. Estas preguntas son cortas, y no tome por más tiempo de 5-10 minutos para terminar.

No hay preguntas correctas o incorrectas, esto no es una prueba; Me gustaría saber lo que piensa.

Esta actividad se llevará a cabo durante una clase de la ciencia y es opcional y no está obligado a participar.

Usted tendrá la opción de mirar su piel bajo una luz especial. Esta luz no le dolía, pero pone de relieve las áreas en la cara que han tenido que mucho sol. Esto no significa que usted tiene daños en la piel o cáncer de piel o significa que tendrá cáncer de piel en el futuro, que sólo muestra las áreas donde se ha producido demasiado sol. Usted no tiene que participar en esta actividad, y todavía se puede participar en los otros.

Puede hacer cualquier pregunta sobre esta actividad. Si decide no terminar la actividad, puede pedir a salir en cualquier momento.

Estar en este proyecto de actividad solar depende de usted. Si se inscribe su nombre en la línea, significa que quiere unirse a la actividad de educación sol. Si no desea estar en esta actividad, no firme su nombre. Usted no tiene que participar en la actividad, incluso si usted se inscribe su nombre en la actualidad. Nadie se molesta si no se inscribe su nombre o si cambia de opinión más adelante. Si no desea participar en cualquier momento que necesita decirle a su mamá o papá, el maestro de la ciencia, la enfermera o el director del proyecto, Amanda Merino.

Sinceramente,

Amanda Merino RN, BSN
Doctorado del estudiante la práctica de enfermería

Firma del alumno

Fecha

Appendix I: Project Timeline

Month	Project Phase	Description
December 2016	1	<ul style="list-style-type: none"> Expanded Literature Review and constructed in-depth synthesis of literature Communicated with capstone chair, submitted rough draft proposal for review Met with KU writing center for further feedback and writing advice Reached out and communicated with principal at selected middle school to set date for project implementation
January 2017	1	<ul style="list-style-type: none"> Edits made to 2nd draft, made final corrections
February 2017	2	<ul style="list-style-type: none"> Proposal Defense Submitted to IRB Project approved from IRB
March 2017	2	<ul style="list-style-type: none"> Finalized program details Met with middle school Implemented program
April 2017	2	<ul style="list-style-type: none"> Began write-up of DNP final project Met with KUMC Biostatistics Department Extracted findings, wrote findings section Wrote discussion and conclusion section
May 2017	3	<ul style="list-style-type: none"> Submitted final DNP project defense paper to portal
June 2017	3	<ul style="list-style-type: none"> Proceeded with 5-week waiting period
July 2017	3	<ul style="list-style-type: none"> Will present final project to chair, board members and faculty

Appendix J: Project Budget/Supplies

Supplies	Amount	Cost
Paper Copies for Parenteral Consent Child Assent	20 Each	\$12
Paper Copies for Questionnaires	20 Each	\$12
Paper Copies for Recommendation Letter to Parents	20 Each	\$7
Cellophane gift bags	20	\$4
Sunglass Participant Gift	20 each	Donated by KU Dietary Services
Lip Balm, Sunscreen, Sun-pocket guide	20 each	Donated by KU Midwest Cancer Alliance
DermaScan Machine	1	Borrowed by KU Midwest Cancer Alliance
Sun Relay Race Items	15-20	Dontated

Total Cost: \$35



Appendix K: Session Outline

Time	Plan
7:45-8am (15 min)	Prepare “Speedy Sun Relay Race” in cafeteria /upload PP
8am- 8:10 (10min)	Introduction, handout/collect child assent, handout pre/post questionnaire
8:10-8:25 (15 min)	Pre-questionnaire
8:25-8:40 (15 min)	Interactive PowerPoint Presentation
8:40-8:44 (4 min)	The faces of pediatric melanoma video clip
8:44-8:47 (3min)	Instructions for Sun Relay race/walk to cafeteria
8:47-9:02 (15min)	Speedy Sun Relay Race
9:02-9:05 (3 min)	Walk back to classroom/ give instruction for DermaScan and Post-questionnaire
9:05-9:25 (20 min)	DermaScan viewing/ Post-questionnaire
9:25-9:30 (5 min)	Conclusion/Thank You’s/ Handout Participation Gift

Appendix L: Speedy Sun Relay Race Instructions

3-5
TEACHER PAGE

Speedy Sun Relay Race

Estimated Time

30 minutes

Supplies

A field or other open space with 20 yards of room
One set of the following SunWise and non-SunWise clothes and items for each team:

Long-sleeved shirt (preferably with collar)

Long pants (optional)

Hats (wide-brimmed, cowboy)

Sunglasses

Empty bottles of sunscreen, some with

SPFs of 15 and higher, some with lower SPFs

Umbrella (optional)

Various other articles of clothing that are

not sun safe, like tank tops, shorts, baseball caps, visors, etc.

Note: Make sure that the clothes are large enough for each student to put on and take off easily.

Learning Objective

This activity will challenge students to think quickly about sun-safe behavior by selecting correct sun-safe clothes in a competitive environment. Students will learn that wearing SunWise clothes is another way to be safe in the sun, and they'll get some exercise,

too! As an assessment, have the class examine the non-winning teams' clothes after the race and suggest corrections.

Directions

Organize the class into teams of five or more and line them up at the start of the racecourse. Place the piles of clothes at the other end of the racecourse.

Have each team select one student to be the SunWise model. This student will stay at the start point of the race, donning sun-safe clothes. The other team members should each take turns running to the pile of clothes, selecting one item, and running it back to the model to wear.

The first team to have a completely and appropriately dressed SunWise model, and that is able to explain why the model is SunWise, is the winner. The SunWise models should be wearing a protective hat, long-sleeved shirt, long pants (optional), and sunglasses, and be carrying a bottle of sunscreen of SPF 15 or higher.



28

3-5
STUDENT PAGE

Speedy Sun Relay Race

Directions

One student in your group will be the "model."

The model's job is to dress in sun-safe clothes as fast as possible with the help of the team.

Across the field will be a pile of clothes. Each team member, besides the model, will take

turns running to the pile, selecting one sun-safe item, and running it back to the model. The

first team to have a completely SunWise model is the winner!

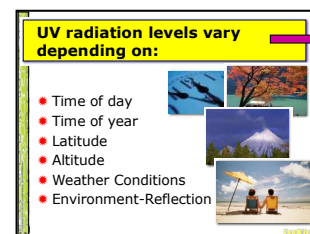
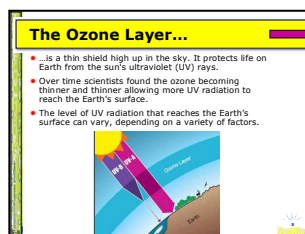
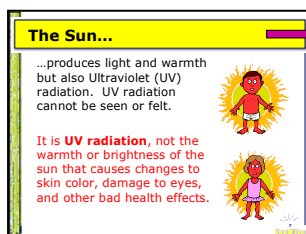
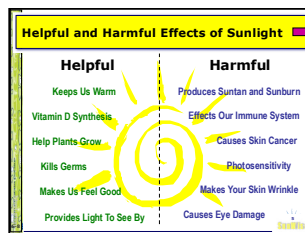
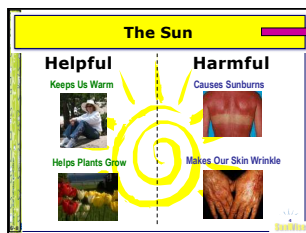


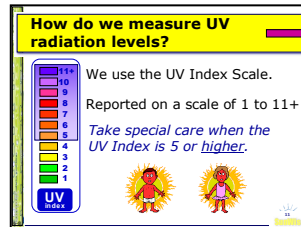
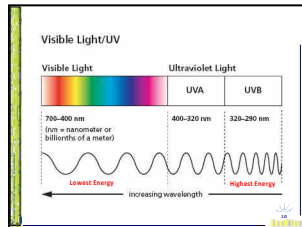
Don't forget that your lips absorb UV rays and are particularly cancer prone. Wear lip balm with SPF 15+ sunscreen when you go outside.



27

Appendix M: SunWise PowerPoint

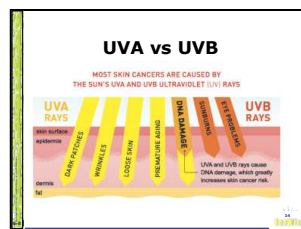




The Burning Facts...

There is no such thing as a healthy suntan!

- UVA rays – premature Aging
- UVB rays – cause of sunburn
- Skin type affects the degree some people burn.
- Use Sunscreen with SPF of 15 or more.
- SPF 30 is NOT twice as protective as SPF 15.



How Can You Become SunWise?

Sun Safety Action Steps

Limit Time in the Midday Sun	Wear Sunglasses
Seek Shade	Use Sunscreen
Cover Up	Avoid Tanning Beds/ Sun-tanning outside
Wear a Hat	Watch for the UV Index

Sun Safety Action Steps

Limit Time in the Midday Sun

The sun's rays are strongest between 10 am and 2 pm.

Sun Safety Action Steps

Seek Shade

Staying under cover is one of the best ways to protect yourself from the sun.

But remember, shade does not offer complete sun protection.


Sun Safety Action Steps



Cover Up !

Wearing tightly woven, loose-fitting, and full-length clothing is a good way to protect your skin from the sun's UV rays.

Sun Safety Action Steps



Use Sunscreen

Use sunscreen of *SPF 15+ and reapply every 2 hours, or after working, swimming, playing, or exercising outdoors.

*SPF= Sun Protection Factor

Sun Safety Action Steps

Wear a Hat



A hat with a wide brim offers good sun protection for your eyes, ears, face, and the back of your neck.

Sun Safety Action Steps



Wear Sunglasses

Sunglasses that provide 99 to 100 percent UVA and UVB protection will greatly reduce sun exposure that can lead to cataracts and other eye damage.


Sun Safety Action Steps

Avoid Tanning Beds



The light source from tanning beds damages the skin and unprotected eyes. It is a good idea to avoid artificial sources of UV light.


Sun Safety Action Steps



Watch for the UV Index


The UV Index provides important information to help you plan your outdoor activities in ways that prevent overexposure to the sun. The UV Index is issued daily across the United States.

Are You SunWise?




Let's Find Out!!

True or False?



You can get sunburned on a cloudy day.

True or False?




You can get sunburned on a cloudy day.

TRUE

Even on an overcast day, 30 to 60 percent of the sun's rays can reach the Earth's surface.

True or False?

You only need to wear sunscreen when you are at the beach.



FALSE

True or False?


You only need to wear sunscreen when you are at the beach.



FALSE

You do not have to be actively sunbathing to get a damaging dose of the sun. Every day exposure counts!


True or False?



Sunscreen with a **SPF of LESS than 15** is enough to protect my skin.

FALSE

True or False?




Sunscreen with a **SPF of LESS than 15** is enough to protect my skin.

FALSE


Use Sunscreen with **SPF 15 or Higher.**

How Does Sunscreen Work?



Photon= Energy of light

Is an SPF of 70 better than a SPF of 30?




FALSE

So what do the numbers on the bottle mean?

- **No Sunscreen**= skin will begin burning in 10 minutes
- **SPF of 15**= 15x longer before you start to burn (if wearing a SPF 15 you will start to burn in 150 min)
- **SPF of 30**= 30x longer before you start to burn (if wearing a SPF 30 you will start to burn in 300 min)


True or False?



My skin is a dark color and I don't get a sunburn, so I don't need to worry about protecting myself from overexposure to the sun.

FALSE

True or False?




My skin doesn't get sunburned, so I don't need to worry about protecting myself from overexposure to the sun.

FALSE

Skin cancer and other bad effects from the sun can affect any person, regardless of skin color.

People of darker skin tones are at a increased risk for Skin Cancer!

- In fact...
 - Skin cancer is more deadly in people with darker skin tones as they are most likely diagnosed with melanoma in the later stage!
 - Ethnicity does not define your skin type
 - 65% of African Americans never use sunscreen (American Cancer Society, 2016)
 - Bob Marley died of melanoma when he was only 36 years




"Wear sunscreen, you only get one skin and you should take care of it"



Whatever You Do... Be SunWise!




[Video Pediatric Melanoma \(2.54\)](#)

[Having lived through Melanoma Video](#)

Appendix N: Pre-Questionnaire

Pre-Test






We have a few questions we want you to answer about yourself and the sun. Thank you for answering these questions. Please use a pencil to fill in the circle for each answer you choose. If you want to change your answer choice, be sure to erase your first choice completely.

- What month is it?

<input type="radio"/> January	<input type="radio"/> February	<input type="radio"/> March	<input type="radio"/> April	<input type="radio"/> May	<input type="radio"/> June
<input type="radio"/> July	<input type="radio"/> August	<input type="radio"/> September	<input type="radio"/> October	<input type="radio"/> November	<input type="radio"/> December
- How old are you? ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14
- Are you a boy or a girl? ☐ Boy ☐ Girl
- What is the color of your hair? ☐ Blond ☐ Red ☐ Brown ☐ Black
- Does your skin burn easily in the sun? ☐ Yes ☐ No ☐ I don't know
- What are some of the ways you can keep your skin safe from the sun?
 * Please fill in as many circles as you need to answer this question.

<input type="radio"/> Eating cereal	<input type="radio"/> Using sunscreen	<input type="radio"/> Wearing a shirt and hat outside
-------------------------------------	---------------------------------------	---


6A. Race ☐ African American (Black)
☐ Caucasian (White)
☐ Hispanic
☐ Other

- When do you have to use the most sun protection?
 When the UV (Ultraviolet) Index is: ☐ 1 ☐ 5 ☐ 10 or higher ☐ I don't know
- You can get a sunburn on a cloudy day. ☐ True ☐ False
- You only need to wear sunscreen when you are at the beach or pool. ☐ True ☐ False
- Keeping your skin safe from the sun is: ☐ Hard to do ☐ Not too hard, not too easy ☐ Easy to do
- Some of the reasons why I do NOT always wear sunscreen when I'm outside are because:
 * Please fill in as many circles as you need to answer this question.

<input type="radio"/> It takes too long to put on sunscreen.	<input type="radio"/> It's hard to put sunscreen on my whole body.
<input type="radio"/> I forget to put on sunscreen.	<input type="radio"/> I don't have any sunscreen.
<input type="radio"/> It stings my eyes.	<input type="radio"/> None—I always wear sunscreen!
<input type="radio"/> Sunscreen feels greasy on my skin.	
- Some of the reasons why I do NOT always wear a hat when I'm outside are because:
 * Please fill in as many circles as you need to answer this question.

<input type="radio"/> I forget to bring a hat.	<input type="radio"/> I don't like to wear a hat.	<input type="radio"/> I don't have a hat.
<input type="radio"/> It's too hot to wear a hat.	<input type="radio"/> None—I always wear a hat!	
- Do you like to get a tan? ☐ Yes ☐ No
- Do you think people look healthier with a tan? ☐ Yes ☐ No

CONTINUED ON THE BACK—PLEASE TURN OVER.



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Pre-Test

15. When you wear a bathing suit outside, what are all of the places that you put on sunscreen?

* Please fill in as many circles as you need to answer this question.

- ☐ My face ☐ My arms ☐ My shoulders ☐ My legs ☐ My back
☐ My ears ☐ My stomach ☐ My neck ☐ I don't put it on

16. Have you ever reminded a:

- Friend to put on sunscreen? ☐ Yes ☐ No
 Sibling (brother or sister) to put on sunscreen? ☐ Yes ☐ No
 Parent or guardian to put on sunscreen? ☐ Yes ☐ No
 Parent or guardian to put sunscreen on you? ☐ Yes ☐ No

17. When you are outside in the sun this coming summer, will you try to play in the shade instead of in the sun?

- ☐ Yes ☐ Most likely ☐ Probably not ☐ No

18. Will you put sunscreen on when you go outside during the day this coming summer?

- ☐ Yes ☐ Most likely ☐ Probably not ☐ No

19. Does your school announce the UV Index? ☐ Yes ☐ No

20. Have you had a school lesson before on sun protection? ☐ Yes ☐ No

When you were outside in the sun last summer:

21. Did you wear a hat?

- ☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

22. Did you wear a long-sleeved shirt?

- ☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

23. Did you wear sunglasses?

- ☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

24. Did you wear sunscreen?

- ☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

25. If you wore sunscreen, what number sunscreen or SPF (sun protection factor) did you use?

- ☐ Less than 15 ☐ 15-29 ☐ 30 or higher ☐ I don't know

26. How many times did you get sunburned?

- ☐ None ☐ One or two ☐ Three or more

27. If you got a sunburn, how many of the sunburns were painful?

- ☐ None ☐ One or two ☐ Three or more ☐ I did not get sunburned

28. How many days a week did you spend outside during the day between 10 AM and 4 PM?

- ☐ 0-1 day per week ☐ 2-3 days per week ☐ 4-5 days per week ☐ 6-7 days per week

29. How many hours a day did you spend outside during the day between 10 AM and 4 PM?

- ☐ Less than 1 hour per day ☐ 1-2 hours per day ☐ 3-4 hours per day ☐ 5-6 hours per day




This survey asks questions about how to keep your skin safe from the sun. You do not have to answer any questions that you do not want to. You can stop being part of the study at any time. To keep your answers private, your name will not be on the survey. This survey should take about 10 minutes to fill out.

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Appendix O: Post-Questionnaire

Post-Test



We have a few questions we want you to answer about yourself and the sun. Thank you for answering these questions. Please use a pencil to fill in the circle for each answer you choose. If you want to change your answer choice, be sure to erase your first choice completely.

What did you like about this sun presentation/activity?

Would you change anything to make it better?


Do you think you know more about sun protection and UV light than before this activity?

☐ Yes ☐ No ☐ Not sure

5. Does your skin burn easily in the sun? ☐ Yes ☐ No ☐ I don't know

6. What are some of the ways you can keep your skin safe from the sun?
 * Please fill in as many circles as you need to answer this question.

☐ Eating cereal ☐ Using sunscreen ☐ Wearing a shirt and hat outside



7. When do you have to use the most sun protection?
 When the UV (Ultraviolet) Index is: ☐ 1 ☐ 5 ☐ 10 or higher ☐ I don't know

8. You can get a sunburn on a cloudy day. ☐ True ☐ False

9. You only need to wear sunscreen when you are at the beach or pool. ☐ True ☐ False

10. Keeping your skin safe from the sun is: ☐ Hard to do ☐ Not too hard, not too easy ☐ Easy to do

11. Some of the reasons why I do NOT always wear sunscreen when I'm outside are because:
 * Please fill in as many circles as you need to answer this question.

☐ It takes too long to put on sunscreen. ☐ It's hard to put sunscreen on my whole body.
☐ I forget to put on sunscreen. ☐ I don't have any sunscreen.
☐ It stings my eyes. ☐ None—I always wear sunscreen!
☐ Sunscreen feels greasy on my skin.

12. Some of the reasons why I do NOT always wear a hat when I'm outside are because:
 * Please fill in as many circles as you need to answer this question.

☐ I forget to bring a hat. ☐ I don't like to wear a hat. ☐ I don't have a hat.
☐ It's too hot to wear a hat. ☐ None—I always wear a hat!

13. Do you like to get a tan? ☐ Yes ☐ No

14. Do you think people look healthier with a tan? ☐ Yes ☐ No

CONTINUED ON THE BACK—PLEASE TURN OVER.

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Post-Test

15. When you wear a bathing suit outside, what are all of the places that you put on sunscreen?

* Please fill in as many circles as you need to answer this question.

- ☐ My face ☐ My arms ☐ My shoulders ☐ My legs ☐ My back
☐ My ears ☐ My stomach ☐ My neck ☐ I don't put it on

16. Have you ever reminded a:

Friend to put on sunscreen?

- ☐ Yes ☐ No

Sibling (brother or sister) to put on sunscreen?

- ☐ Yes ☐ No

Parent or guardian to put on sunscreen?

- ☐ Yes ☐ No

Parent or guardian to put sunscreen on you?

- ☐ Yes ☐ No

17. When you are outside in the sun this coming summer, will you try to play in the shade instead of in the sun?

- ☐ Yes ☐ Most likely ☐ Probably not ☐ No

18. Will you put sunscreen on when you go outside during the day this coming summer?

- ☐ Yes ☐ Most likely ☐ Probably not ☐ No

19. Does your school announce the UV Index? ☐ Yes ☐ No

When you were outside in the sun last summer:

20. Did you wear a hat?

- ☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

21. Did you wear a long-sleeved shirt?

- ☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

22. Did you wear sunglasses?

- ☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

23. Did you wear sunscreen?

- ☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

24. If you wore sunscreen, what number sunscreen or SPF (sun protection factor) did you use?

- ☐ Less than 15 ☐ 15-29 ☐ 30 or higher ☐ I don't know

25. How many times did you get sunburned?

- ☐ None ☐ One or two ☐ Three or more

26. If you got a sunburn, how many of the sunburns were painful?

- ☐ None ☐ One or two ☐ Three or more ☐ I did not get sunburned

27. How many days a week did you spend outside during the day between 10 AM and 4 PM?

- ☐ 0-1 day per week ☐ 2-3 days per week ☐ 4-5 days per week ☐ 6-7 days per week

28. How many hours a day did you spend outside during the day between 10 AM and 4 PM?

- ☐ Less than 1 hour per day ☐ 1-2 hours per day ☐ 3-4 hours per day ☐ 5-6 hours per day



This survey asks questions about how to keep your skin safe from the sun. You do not have to answer any questions that you do not want to. You can stop being part of the study at any time. To keep your answers private, your name will not be on the survey. This survey should take about 10 minutes to fill out.

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Appendix P: Acronyms

Academic Center for Evidence-based Practice(ACE)

American Melanoma Foundation (AMF)

Center for Disease Control and Prevention (CDC)

Doctor of Nursing Practice (DNP)

Environmental Protection Agency (EPA)

Health Belief Model (HBM)

Institutional Review Board (IRB)

Kansas Department of Health and Environment (KDHE)

Kindergarten through eighth grade (K-8)

Morbidity and Mortality Weekly Report (MMWR)

Physical Education (P.E.)

Random Control Trial (RCT)

Registered Nurse (RN)

Students Are Sun Safe Program (SASS)

Sun Protection Factor (SPF)

Sunny Days Healthy Ways Program (SDHW)

Tuberculosis (TB)

Quality Improvement (QI)

Ultraviolet (UV)

Ultraviolet A (UVA)

Ultraviolet B (UVB)

Ultraviolet Radiation (UVR)

United States (US)

University of Arizona (UA)

University of Kansas Medical Center (KUMC)

United States Department of Health and Human Services (USDHSS)

World Health Organization (WHO)

World Wide Web (WWW)